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VIEWS, NEWS AND INTERVIEWS.

A good many years ago Theodore M. Foote, the electrical inventor, now living in Chicago, went to see James Gordon Bennett, the younger, concerning an invention for the transmission of messages by ocean cable, says the *Fourth Estate*. He was accompanied by D. H. Craig, founder of the Associated Press, and an old friend of Bennett, senior. Young Bennett received both men cordially, heard Foote's story, and when he had finished said: "I believe, Mr. Foote, that your invention is a great thing, and I would like well enough to take it up. But," and he pointed to a large picture of his father which hung over his desk, "that old gentleman there told me never to put any money into anything outside our paper. And now, to be frank, I'm afraid to disobey him." "It was quite a dramatic little scene," said Foote, "and I have wondered since if the young man always has maintained the same strict standard of filial obedience to the wishes of his dead father." Since then James Gordon Bennett has become one of the principal owners of an ocean cable telegraph company.

Prizes have been awarded for plans to develop 20,000 horse-power from the River Rhone on the Canal du Tonage to supply the town of Lyons, France, with electricity for lighting and industrial power purposes.

The Prince of Montenegro has conferred the Order of the Eagle on Nikola Tesla.

The French Société Electro-Metallurgique has, according to a foreign exchange, recently supplied to M. E. C. Grammont an electric conductor made of aluminium, to be used in an electric power transmission at the Plaine and Pont de Cherny works of M. Grammont.

It is recorded that the first Ural miners were much disgusted with platinum, and did not know what to do with the hard, dirty-looking metal, says a London contemporary. They thought that they had solved the problem of successful utilization when they had made bullets of it for their sporting muskets. The annual platinum consumption of a few years ago of four tons has, of course, increased very considerably with the development of electric lighting.

F. Himstedt has made a new determination of the ohm in terms of the Siemens mercury unit by his inductive method, and has obtained a mean result—one ohm equals 1.06282 Siemens unit.

Genius is a rare gift, and if it be true that genius consists in the possession of one individual of some trait of character not possessed in general by mankind, then I take it that the faculty called common sense is one of the most marked attributes of genius, since it is so very uncommon.—*Prof. Edwin J. Houston.*

Work on the Phœnix Telephone Company's plant at Altoona, Pa., is progressing.

Electric Transmission Project at Lee, Mass.

A meeting of Lee, Mass., capitalists and mill owners was held last week on the project of establishing an electric plant to furnish power to the various mills on the river from Lake May, which now depend on water and steam power. The plan is to pipe water from Lake May about three miles down stream by which a fall of 600 feet can be secured. It is estimated that sufficient electricity can be generated by this means to furnish power for several mills. A stock company may be formed to push the thing through.

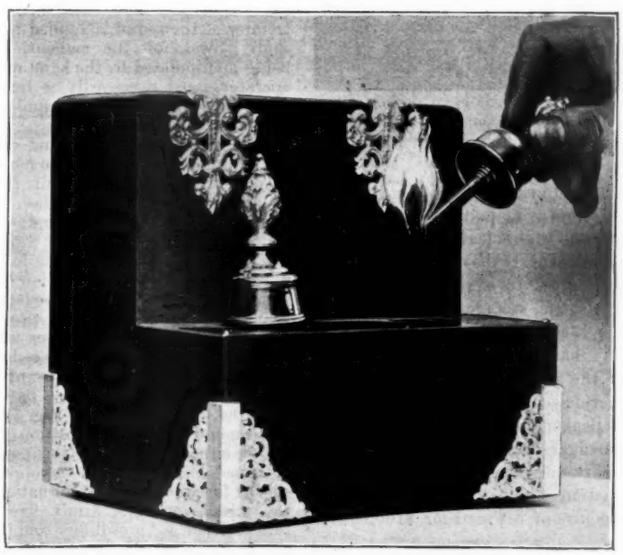


Fig. 1.—Upright Form of Universal Electric Cigar-Lighter.

Pennsylvania Street Railway Association.

The fourth annual meeting of the Pennsylvania Street Railway Association begins to-day at Wilkesbarre and continues through to-morrow. It is understood that an interesting programme of papers and discussions has been provided and that a number of matters affecting the street railway interests of the State will be considered.

The Universal Electric Cigar-Lighter.

The accompanying illustrations show two forms of a very satisfactory electric cigar-lighter, made by the Universal Lighter Company, 621 Broadway, New York city. The device consists of a dry battery, a spark coil, a torch and spring contact points between which the torch slides. The circuit is broken in four places, so that there is little or no danger of the batteries being short-circuited and run down when the lighter is not in use. The torch contains an asbestos-packed wick which will last indefinitely. The torch handle is hollow and about once a week the top is unscrewed and a teaspoonful of gasoline or spirits is poured in to moisten the wick. This is the only attention the lighter requires, as the batteries are expected to last at least a year with ordinary use. The light is obtained by simply pulling the torch from its sheath, which breaks the circuit and causes a spark that lights the wick. The light is extinguished by replacing the torch in its sheath.

Fig. 1 shows a lighter made in the form of an upright piano. The case is of highly polished wood and the metal trimmings are nickel-plated. This makes a very attractive lighter for a cigar store. The dimensions of the case are nine and a half inches high, ten inches long and six inches wide. Another type of this lighter is made for low counters or bars. The torches can be reached from all sides. The case is 3½x11x7½ inches.

In Fig. 2 is shown a form of lighter for attachment to a wall in clubs, hotels and private dwellings, where one or more lighters are needed in every room. This lighter does away with burnt matches being thrown on the carpet or floor and also keeps the woodwork, tables, chairs, etc., from being scratched up. It is located in a convenient place in each room, and the batteries are placed in the cellar or some out-of-the-way corner; all the lighters being connected on the one circuit, use the one set of batteries and spark-coil. This lighter is made of metal and is silver-plated.

Cincinnati Edison Company Wins a Suit.

Some time ago William M. Ampt, as a tax-payer, sued the city of Cincinnati, the Board of Administration, the City Auditor and Treasurer, to enjoin the city and its officials from auditing or paying any bills of the Cincinnati Edison Electric Company, under its contract with the city, by the several ordinances passed in May, 1892, by council for lighting the city of Cincinnati by districts at the rate of $80 per lamp for a period of 11 years. The plaintiff claimed that the contract was illegal and invalid, on the ground that there never had been a certification by the City Auditor that the funds necessary for carrying out the contracts were in the treasury, as provided by law at the time the contract was entered into.

Judge Wilson, some months ago, overruled a demurrer to the plaintiff's petition by the city, on the ground that the certificate of the Auditor was necessary as a condition precedent to the making of the contract, the court holding on demurrer that the plaintiff had a cause of action against the city. At that time the Edison company was not a party to the suit, and its rights were not before the court. The company then came in and filed an answer, in which it set out at great length the history of the contract made for lighting the city.

Judge Wright recently followed and approved Judge Wilson's decision on the demurrer, and admits the invalidity of the contract for want of the auditor's certificate. But upon the answer of the Edison company, subsequently filed, a new and entirely different state of facts was presented, and upon it the court found the equities of the case to be entirely with the defendant, the Edison company, and overruled the motion for judgment on the pleadings, and dismissed plaintiff's petition. The court's finding upon the motion made by Mr. Ampt for judgment on the pleadings, after the Edison company's answer had been filed, is condensed and very strongly stated in the following syllabi:

1. A court of equity remains passive until a case of "equities" is presented, which, under the rule of equity jurisprudence, calls the power of the court into activity.

2. The bare fact that a partly-executed contract with a municipal corporation is void under the letter of the law is not of necessity ground for restraining further action under such contract when its terms and results execute and satisfy the purpose and spirit of the law.

3. If the law authorizes a municipal corporation to contract for a present supply of that which is in continuous demand and use, and a contract therefor is in good faith made, is partly executed, vast expense incurred by the contractor in preparing to complete it, when the municipal authorities desire to continue it, when the current revenues are sufficient to meet all current demands, where it is to the financial interest of the public and of the taxpaying citizen that it should continue; a court of equity will not, at the suit of a taxpayer, enjoin the execution of such contract until such "equities" are presented either of the public or of the taxpayer, as demand it; although the contract be conceded to be void: First, for want of the auditor's certificate; second, because it is to extend for a period longer than that authorized by the letter of the law.

4. An injunction is refused here not because a municipal corporation can be estopped, but because the plaintiff has not presented a case which calls the powers of a court of equity into activity.

Storage Battery Traction In Philadelphia.

The announcement has been made in Philadelphia that the Southern Passenger Railway would in a short time build and operate the down-town street railway for which it was chartered and received a franchise from councils. The proposed road has been commonly known as the Carpenter and Reed streets line, for it is to run east and west between the two rivers principally on those streets. An important feature of the announcement is that negotiations are in progress to equip the road with an electric storage battery system. The Electric Storage Battery Company has already submitted figures for the equipment of 12 cars with chloride accumulators. State Senator Becker, president of the Southern Passenger Railway Company, denied the rumor that the Philadelphia Traction Company had bought the franchise of his road for $100,000.

FIG. 2.—UNIVERSAL ELECTRIC LIGHTER FOR ATTACHMENT TO WALL. (See page 127.)

Niagara Falls Power.

The Niagara Falls Power Company made its first commercial delivery of electric current at 7:30 A. M., on August 26. Dynamo No. 2 was set in motion and 2,000 horse-power was delivered to the works of the Pittsburgh Reduction Company. Everything was found to work perfectly, and great satisfaction was expressed by the officers.

The building of the electric railroad between North Adams and Williamstown, Mass., has been begun in earnest and the past week the company has graded the right of way through what was considered the worst place on the whole road.

AN ELECTRIC PRESSURE SOUND FOR THE DIRECT VIBRATION OF THE MEMBRANA TYMPANI.

BY JOHN C. LESTER, A.M., M.D., IN THE "NEW YORK MEDICAL JOURNAL."

The value of vibratory massage in the treatment of diseases, especially the atropic, of the upper air passages, has been fully attested by many careful observers of recent date. Dr. Michael Braun,* of Triest, in a paper read before the International Medical Congress at Berlin, was the first to call attention to the value of massage in diseases of the naso-pharynx.

Dr. Carl Laker† has also written an exhaustive monograph on the same subject, in which he enthusiastically indorses this method of treatment. To Dr. W. Freudenthal,‡ of New York city, perhaps more than to any other, is due the honor of having devised an electrical instrument for massage in diseases of the nose and throat. More recently Dr. G. Melville Black,§ of Denver, calls attention to the value of lateral vibratory massage in diseases of the nasal mucous membrane. Possibly the inspiration of all these writers on the value of massage in naso-pharyngeal diseases was received from an investigator no less distinguished in another field—Dr. August Lucae.‖ In an article on "A New Method for the Mechanical Treatment of Chronic Diseases of Motion in the Conducting Apparatus of the Acoustic Organ," Lucae first described an instrument for direct mechanical vibration of the membrana tympani. Lucae's device consisted essentially of a steel sound carrying at its end a hollow cone, which is controlled by a handle composed of a small tube and an adjustable spiral spring. The cup-shaped extremity of the sound is applied to the short process of the malleus, and, being manipulated by the hand of the operator, must necessarily be limited as to degree, extent and number of impulses.

The fact that so simple and crude a mechanical device has led to marked therapeutical results in certain forms of middle-ear disease, as has been certified to by its author and other eminent aurists, sufficiently excuses the writer for presenting the following illustrations and description of an instrument which has proved more than satisfactory in those cases of impaired hearing and tinnitus which are directly traceable to some defect in the conducting apparatus of the ear.

In the first illustration (Fig. 1) the instrument is shown in position. As will be seen, the head of the patient is turned slightly toward the opposite side as for an ordinary examination of the middle ear, and firmly fixed in this position. An ordinary round ear speculum is introduced and the canal illuminated in the usual manner. The speculum is omitted from the illustration in order to show more clearly the position of the sound as it enters the external auditory canal. The motor, with pressure sound attached, is shown in Fig. 2. The right hand grasps the handle of motor, with the thumb resting on the button of the contact spring. The corrugated handle B (Fig. 3) of the pressure sound A (Fig. 3) is firmly held between the thumb and index finger of the left hand. The tip of the little finger is made to rest gently on the head of the patient immediately behind the auricle, and the sound is introduced parallel to the anterior superior wall of the auditory canal, until the cylindrical extremity of the spiral end D (Fig. 3) rests upon the base of the short process of the malleus. The short process of the malleus is selected as the point of contact, as it has been demonstrated by Lucae* that "if the malleus is still movable, more or less free movements are seen at once to take place in the whole drum membrane, which in the majority of cases correspond to the movements of the short process—*i. e.*, occurring inward on pressure upon the latter and outward on removal of pressure." Dr. E. B. Dench,† in his recent work on the ear, referring to the same subject, says: "It has been demonstrated that pressure exerted at the short process of the malleus is communicated directly through the incus to the footplate of the stapes and from this to the labyrinth."

When contact is made with the pressure button before referred to, vibrations ranging from 500 to 1,500 or more a minute, judging from the note obtained from the revolutions of the armature, are produced. The extent or length of the vibrations is thoroughly controlled by the eccentric throw G (Fig. 3) and the binding screw H (Fig. 3), the range being from zero to half an inch.

In the cases so far treated the best results have been obtained by a minimum length or extent of vibrations and a maximum number of vibrations. It is seldom that the binding screw has been further removed from the center of the eccentric throw than a sixteenth of an inch, and when this minimum length of stroke has been adhered to, in no case has the patient experienced pain.

In a few instances, where a slight discomfort has been noticed, examination has shown this to be due to undue pressure on the speculum. Eczematous and excoriated canals, of course, must be cured before beginning the massage of the drum membrane.

The duration of treatment varies, the average being from three to ten seconds at each sitting, and should be repeated from two to three times a week.

A few mechanical hints, developed from several months' use of this treatment, may not be unwise at this point before presenting a few histories illustrating its therapeutic value.

The motor and sound should be firmly and steadily held in the same plane (see Fig. 1). As the motor and sound are carefully adjusted to run smoothly at right angles, any twisting of the motor will cause an immediate binding of the shaft E (Fig. 3). The pressure sound A (Fig. 3) is made an inch longer than the handle B (Fig. 3), to allow for the length of vibration, and the handle must be held in the center of the sound.

The cylindrical end of the sound A (Fig. 3) enlarges toward its distal extremity and in shape resembles more nearly a truncated cone. It is hollowed out, as will be seen by the dotted lines in the cut, not only to better adapt itself to the short process of the malleus, but also to receive a pledget of absorbent cotton or other soft material in order to prevent any possibility of mechanical injury. Sounds with spirals of different strengths have been found necessary, and in every case the writer has found it wiser to begin with the one of least resistance and to continue its use until the patient's confidence has been secured and a certain degree of tolerance obtained. The motor is

* Verhandlungen des 10, Internat. Med. Cong., Berlin, 1890.
† Die Heil-Erfolge der inneren Schleimhautmassage, Graz., 1892.
‡ Internal Massage in Diseases of the Nose and Throat, *Medical Record*, Vol. XLVIII, No. 4.
§ New Instrument for Vibratory Massage of the Nasal Mucous Membrane, *N. Y. Med. Jour.*, Vol. IX., No. 25.
‖ Archiv für Ohrenheilkunde, Band XXI, 1884.

* Achiv für Ohrenheilkunde, Vol. XXI, p. 84.
† Dench. Diseases of the Ear, p 382.

adapted to a two-volt current. Any good storage cell will suffice.

A few brief histories are presented to show the results obtained. In each case reported other methods of treatment had been persistently tried without lasting, and, I might say, with no benefit.

Case I—Essie L., aged 19 years; occupation dressmaker. Came to St. Bartholomew's clinic for treatment on December 4, 1894. Complained of deafness and constant ringing in both ears. The following history was obtained: Deafness and tinnitus in both ears for three years; unable to state in which ear symptoms began first; has had treatment for nine months, with the result of a slight improvement in hearing, but no relief from the tinnitus; never had pain or discharge from either ear; no assignable cause; no heredity.

Examination—Auricles and canals normal; both *membranæ tympani* uniformly cloudy and moderately retracted, but not funnel-shaped; light reflex lost; short process not unduly prominent; little or no fibrous tissue; membrane moved throughout by Siegel's otoscope; handle of malleus slightly foreshortened; Eustachian tubes patulous; watch heard on contact only; bone conduction markedly increased; lower tone limit elevated; chronic catarrhal inflammation of the naso-pharynx.

This case will be readily recognized as one of chronic catarrhal otitis media.

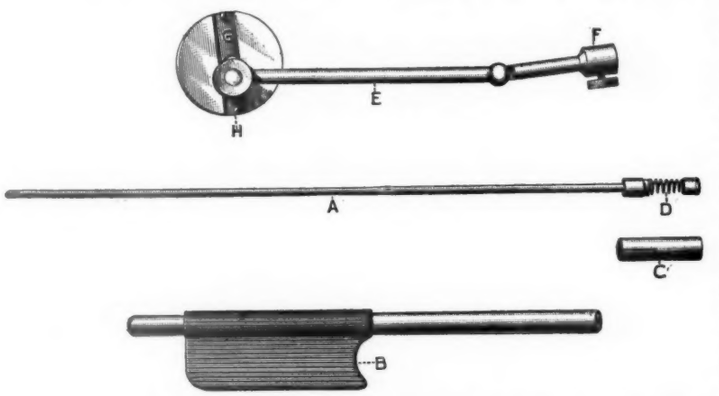


FIG. 3.—G, eccentric throw; H, stud and sleeve with binding screw; E, adjustable connecting rod or shaft; F, receiving socket with binding screw for pressure sound; A, pressure sound and spiral spring (D); C, protecting cap for spring when not in use; B, corrugated handle and tube.

Treatment consisted of ordinary cleansing and care of naso-pharynx and direct massage of the ossicular chain three times a week, each treatment lasting from five to 30 seconds, or until there was marked congestion of the vessels about the long process of the malleus. The ready congestion of the tissues immediately around the handle of the malleus, the writer believes, has much to do with the prognosis in a given case. After the third massage, the tinnitus, which had been greatly diminished in intensity by the previous treatments, ceased and the hearing distance increased to an inch.

January 14, 1895, date of last visit, hearing distance had increased to four inches ($\frac{4}{12}$) and tinnitus had not returned.

Case II—Allied to case I, but of longer duration, is that of C. F. M., aged 40 years; occupation physician. Right ear chiefly involved; tinnitus and impaired hearing for five or more years; no pain; no discharge; no hereditary tendency. Auricle was found to be normal; slight squamous eczema of canal; drum membrane dull; no light reflex; scar tissue marked; movement of drum and malleus limited; short process prominent and long process foreshortened; ossicles firmly bound together and mucous membrane apparently thickened; Eustachian tube open, but not freely so; slight mucous rhonchi; watch heard on close contact; chronic hypertrophic naso-pharyngitis and pharyngeal tonsils filled with leptothrix masses.

Treatment began March, 1894. Politzerization; use of Delstanche masseur; applications to the naso-pharynx and squeezing out of the masses from the tonsils resulted in a decided improvement of the general condition, but no corresponding improvement in the symptoms most complained of.

Treatment was discontinued during the Summer to be resumed early in December; conditions the same as before treatment, with the exception of the naso-pharynx. Direct massage was immediately begun on patient's return and treatment of naso-pharynx continued. The lessening of the tinnitus began with the first massage, and at present writing, March, 1895, hearing distance for affected ear is two inches ($\frac{8}{12}$) and tinnitus can only be heard occasionally at night with the head resting on a pillow.

FIG. 1.—MOTOR AND PRESSURE SOUND IN POSITION.

Case III—A. M., aged 29 years; began treatment February 4, 1895. Complained of loss of hearing and tinnitus in both ears; more pronounced in right ear; duration, four years; has had an occasional furunculosis of both canals. Examination revealed a case of chronic catarrh of the middle ear. Watch heard on contact, A. D., and at an inch ($\frac{1}{12}$), A. S.

Patient has had massage of drum membrane twice a week regularly.

On March 14, date of last record, watch was heard by A. S. at seven inches ($\frac{7}{12}$), A. D. two inches ($\frac{2}{12}$). Entirely free from tinnitus.

From the cases herewith reported, and from a large number now under treatment, both in private practice and at the clinic, the writer feels justified in the following conclusions:

That in the mechanical mobilization of the ossicles by vibratory massage we have an agent of undoubted value in chronic and subacute affections of the middle ear. That the therapeutic value of this method depends largely on the rapidity and amplitude of the vibrations.

That it is a safe method of treatment in all cases of impaired function due to some defect in the conducting apparatus. That it is of especial value in sclerosis and in atropic conditions by virtue of its action in increasing the vascularity and hence the nutrition of the part.

That in hypertropic otitis media this method is safer and to be preferred to the pneumatic method of Delstanche, which is unsafe and in many cases positively harmful.

That it is a method easy of application, causes little or no reaction, and is unattended with pain or discomfort to the patient.

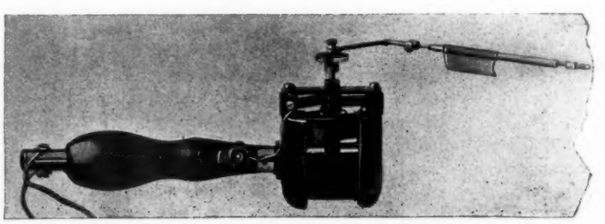


FIG. 2.—MOTOR WITH PRESSURE SOUND ATTACHED.

Since writing the above, we have been especially fortunate in having obtained and read an article by so eminent an authority as Dr. P. Garnault,* who has devised and used an electric pressure sound similar in construction to the one described above.

In addition to massage through the external auditory canal, Dr. Garnault has employed rapid (600 to 700 per minute) vibrations through the Eustachian tube to the drum membrane, which he believes to be especially useful in certain labyrinthine diseases.

Garnault's results have been corroborative of those published by Lucae. The value of rapid and mechanically accurate vibration is particularly emphasized by this writer.

Since the publication of this article the writer has devised a sound for the vibration of the throat and nose in atropic catarrh. The sound is adapted to the same motor and connecting rod as the pressure sound for the ear.

An Electric Railway Acquires Valuable Coal Mining Land.

One of the biggest surprises ever created in Youngstown, Ohio, came out recently when it became known how great is the enterprise the Park and Falls Electric Railroad Company has on hand, says a press dispatch.

People have known the company was building an electric railroad toward North Lima, but further than that the company has succeeded in keeping its business to itself. It now transpires that negotiations have been quietly going on and this company and others have tied up about 5,000 acres of coal land, which is not approached by any other railroad, about eight miles south of Youngstown. The company has just as quietly contracted to deliver 1,000 tons of coal a day in Youngstown after November 1, and has closed up contracts to run milk trains and to carry express and mail matter. Eight large motor cars have been ordered and 100 gondolas for coal. Each motor car is to haul 100 tons of coal eight miles an hour. It was also learned that the company has decided to increase its capital stock from $50,000 to $700,000.

LITERARY.

The Funk & Wagnalls Company, 30 Lafayette Place, New York, will issue a new series of educational books which, it is believed, will prove an advance on all books of this class. They will be, in some measure, a complement to the Funk & Wagnalls Company's "Standard Dictionary."

The success of a magazine serial dealing with contemporary American affairs has been abundantly demonstrated by the wide and permanent interest that has been aroused by President Andrews's "History of the Last Quarter Century in the United States," now running in *Scribner's Magazine*. The great variety of the topics so dramatically treated makes each instalment of new interest to old readers and also attracts the attention of newer circles.

* La Massage vibratoire et électrique dans les affections de la gorge, des oreilles et du nez. Société d'editeurs scientifiques, Paris, 1894.

ELECTRIC RAILWAY NOTES.

The Lock City electric street railway at Lockport, N. Y., is now in operation.

Surveys have been completed for a new electric railway between Norwich and New London, Conn.

Every street car in Omaha, Neb., is now operated by electricity. The last horse-car was taken off on August 13.

The Union Railway Company has been laying new tracks on the upper part of the Southern Boulevard, New York city.

During two recent days 60,000 people went from Philadelphia to Atlantic City and Cape May over two steam railways.

The last horse car in Cleveland, O., will soon be run into the barn. The only existing bob-tail line is to be done away with.

The electric railway at Brattleboro, Vt., is a great success. Over 13,000 fares were collected during the third week of its operation.

Work is being pushed rapidly on the new power-house of the West End Street Railway Company at the Neck, Charlestown, Mass.

It is said that Old Falls, seven miles below Sanford, Me., may be utilized to generate electric power for the Mousam River Railroad.

Kansas City, Mo., wants the electric railway companies in that city to provide special cars for trolley parties like they have in the effete East.

The directors of the proposed Frederick and Middletown, Md., electric railway state that they now have only $5,000 to raise and will soon begin work.

The Brooklyn City Railroad Company, of Brooklyn, N. Y., has just put in operation a trolley street sprinkler. Six men are required to operate it.

Mr. Ream, the chief owner of the Consolidated street railway of Toledo, Ohio, intimates that the lines of his company will be extended to Presque Isle in another year.

The Nassau Electric Railroad Company, of Brooklyn, N. Y., has 30 new open cars. Its line to Canarsie is a great success and extensions of its system are being rapidly made.

The Massachusetts Railroad Commissioners have given street railway companies in that State until November 14 next to equip their cars with efficient fenders and wheel guards.

The Gratiot avenue line of the Citizens' Street Railway Company, of Detroit, was put in operation on August 23. The running time of the old horse cars has been cut down one-half.

The Columbus Street Railroad Company reports gross earnings for July of $55,898, an increase of $4,611 as compared with the same month of last year, and net $28,380, an increase of $186.

The New Orleans Traction Company makes the following showing for July: Gross $120,088, increase $46,599; operating expenses $79,464, increase $28,225; net $40,624, increase $18,374.

The Lutheran Cemetery steam line of the Brooklyn Heights Railroad Company, running between Ridgewood and Lutheran Cemetery, near Brooklyn, N. Y., has been changed into an electric system.

The directors of the Mystic Valley, Mass., Street Railway Company will call a meeting of the stockholders in a short time for the election of officers. Over $40,000 of the capital stock has already been subscribed for.

There were 4,000 people present at a balloon ascension and electric searchlight display at Leavenworth, Kas., on August 7. The electric cars carried over 3,000 people to Ft. Leavenworth where the display was held.

The Albany Electric Railway Company has replaced, at a cost of $1,419.26, water mains in the vicinity of its power house, which had been damaged by the electrolytic action of return trolley currents from its lines.

A director estimates that it will require 1,000 to 1,500 additional horsepower to heat the West End railway cars in Boston by electricity next Winter, and that the cost of heating will be some one-half per cent on the capital.

The Big Consolidated Company of Cleveland, O., has decided that the trailer must go, and with that end in view, the company is now building a number of combination cars, which will be put into use as soon as completed.

In order to retain its franchise in McKeesport, Pa., the Second Avenue Traction Company, of Pittsburgh, is compelled, by an ordinance passed by the councils, to sell eight tickets for 25 cents on all its lines within the city limits.

It is reported that New Yorkers are trying to secure control of the Hestonville, Mantua & Fairmount Passenger Railway Company, the only street railway company in Philadelphia not included in the new Union Traction Company.

The Moyamensing Avenue and Penrose Ferry Passenger Railway Company, of Philadelphia, has at last got its permit to lay its road, and the work of construction will begin at once. The company has had an up-hill fight to get permission.

Judge John D. Miller, in the case of the Union Trust Company, of St. Louis, against the Richmond, Ind., Street Railway Company, has issued a decree ordering the line sold in default of the payment of a judgment in favor of the trust company for $228,116.67. The sale will occur in September.

The Niagara Falls & Lewiston Railroad Company has elected the following directors: John M. Brinker, Robert W. Jones, F. C. M. Lautz, Daniel O'Day, Herbert P. Bissell, D. N. Evans, W. S. Pitman, Frank M. Brinker, Bert L. Jones, C. D. R. Stowitts, Charles R. Huntley, E. T. Brinker and F. A. Mohr.

The agitation for cheaper street car fares for working people in Cincinnati assumed definite shape recently when the Cincinnati Trades and Labor Assembly indorsed a petition requesting the street car companies to reduce the fare to three cents cash during the hours between 5 and 8 A. M. and 5 and 7 P. M.

The Paterson, N. J., Railway Company makes the following showing for July: Gross, $28,624; increase, $3,577; operating expenses, $15,256; increase, $1,143; net, $13,368; increase, $2,433. Seven months ending July 31: Gross, $162,216; increase, $26,240; operating expenses, $97,685; increase, $7,030; net, $64,530; increase, $19,209.

The governors of McGill University are decidedly opposed to the scheme for the extension of the line of the Montreal, P. Q., Street Railway along University street, above St. Catherine street, on account of the injury to delicate scientific and electrical instruments which they say will be caused by the heavy current and vibrations of the cars.

State Railway Commissioner Kirby, of Ohio, is sending out a circular letter to county auditors, asking them to inform him as to the names of the electric railways in their counties, the number of miles in operation within cities and towns and the number of miles in operation outside of them, for use in making the statistics of his annual report.

The extermination of the horse, so far as Boston street railways are concerned, is at hand. The two companies which operate in the city have substituted electricity as a motive power on all but three lines, and the welcome announcement is made that one of these lines—the one running to East Somerville—is to be converted within a month.

The Consolidated Street Railway Company, of Syracuse, N. Y., was sold on foreclosure proceedings by the sheriff on August 17 to Frederick Strauss, of New York, representing the reorganization committee of the majority bondholders, for $865,000. The only other bidder was H. Clark Ford, of Cleveland, who bid for the Syracuse Street Railroad Company $864,000.

The stockholders of the Alton, Ill., Electric Street Railway Company, recently authorized the directors to sell and dispose of all property and franchises belonging to that company to the Alton Railway and Illuminating Company. This completes the transfers incidental to the consolidation of all lighting and street railway companies in Alton, and they will in a short time be ready for business.

The South California Motor Road has been sold to the Pacific Improvement Company for $167,100. This road runs from San Bernardino to Riverside, Cal., a distance of 13 miles. It is understood that the purchase was made for the Southern Pacific, and the motor road will be incorporated in that system as a branch, and as an extension of the projected new road from Los Angeles to Redlands.

The Pennsylvania Railroad, it is understood, is preparing to apply the trolley system to its branch from New Brunswick to Millstone, N. J. This is in accord with the policy adopted on the successful application of electricity on the Burlington & Mount Holly division. The equipment between New Brunswick and Millstone will be similar to that in use on the Mount Holly division, subject to such improvement as may be suggested.

The annual report of the Troy City Railway Company for the year ended June 30 shows in part as follows:

	1894.	1895.
Gross earnings	$422,519.84	$454,078.27
Operating expenses	206,465.72	229,565.54
Net from operation	$216,465.72	$224,512.73
Other income	2,895 45	1,912.60
Gross income	$218,949.10	$226,425.33
Property taxes	$5,636.43	$5,732.44
Franchise taxes	5,254.57	5,675.65
Interest	101,354.59	101,774.31
Railroad rents	6,350.00	6,350.00
Total fixed charges	$118,595.59	$119,532.40
Net income	$100,353.51	$106,892.93
Dividends paid	100,000.00	105,000.00
Surplus for year	$353.51	$1,892.93

It is stated that the consolidation of all the street railroad lines of Chicago under the Yerkes régime is a question of but a short time, and this scheme may also include the Northwestern and Lake street elevated roads. The Yerkes companies are the West Chicago Street Railroad, North Chicago Railroad, North Chicago Electric, Chicago Electric Transit, North Side Electric, Cicero & Proviso, Jefferson & Urban and North Shore Street Railroad. Their total stock is $28,893,000, and bonds $37,493,060.

The report of the Rochester, N. Y., Railway Company for the quarter ended June 30, shows: Gross earnings from operation, $220,167.02; operating expenses, $127,096.98; net earnings from operation, $93,070.04; income from other sources, $1,536,66; gross income from all sources, $94,-606.70. The report for the same quarter of 1894 showed: Gross earnings from operation, $179,969.47; operating expenses, $104,042.69; net earnings from operation, $75,926.78; income from other sources, $1,949.98; gross income from all sources, $77,876.76.

The Brooklyn, N. Y., City Railroad Company has put into operation what it terms a school for motormen. It is in session every day on the Second avenue line of the road, between the Thirty-ninth street ferry and Bensonhurst, and the school cars attract no little attention. The people along that line have become more or less used to the cars, which at first, because of a sign "No passengers," caused them not a little worry. The scheme is a commendable one, and the railroad is given credit for consideration for the public safety. On board each of the school cars are two experienced men, employed as instructors, and to their tender mercies the raw motorman is given, after he has successfully passed the physical examination.

The Ferranti Rectifier in the Edinburgh Central Station.

The Edinburgh Corporation Electric Light Works is one of the most recently opened and is in many respects one of the most modern and up-to-date central stations in Great Britain. It is chiefly remarkable in that it aggregates under one roof two distinct and separate systems of supply. To make the reasons clear that have led to this system, it is necessary to mention two or three geographical facts concerning the district. The town of Edinburgh consists of two districts, which are known as the northern and the southern. The former is compact, and includes the business portion and much of the residential portion of the city; while the southern district is poorer, and the houses and premises, where a supply of electricity is likely to be needed, more scattered.

Professor Kennedy, who has engineered the scheme throughout, in his report to the Town Council, said that the local conditions indicated that a low tension system should be adopted for the northern district, and a high tension for the southern part of the town. The success that has attended the inauguration of the works has been remarkable. It is yet too early to say that this success is due to any peculiarity of the system, inasmuch as the novel part of the design has been intended to meet future demands. The combined system that has been adopted is a high tension alternating, with Ferranti rectifiers for arc lighting, and a low tension three-wire system.

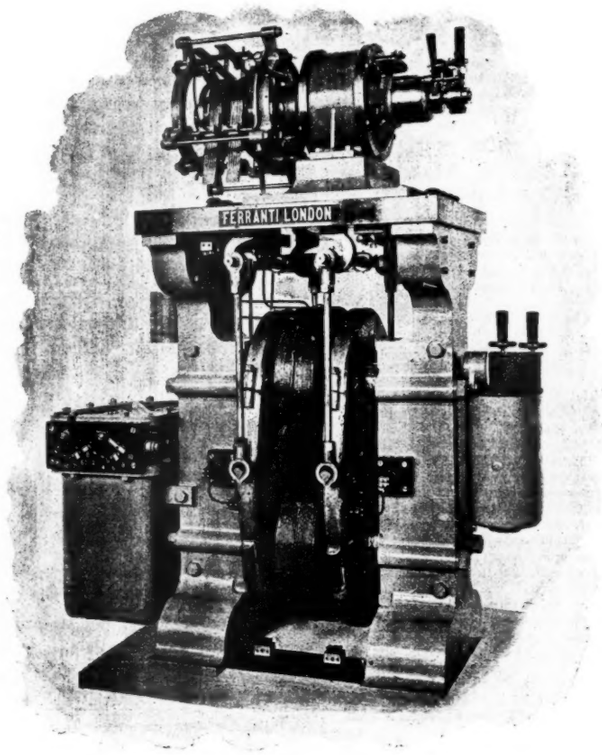
The accompanying illustration, for which and the data we are indebted to our London namesake, shows one of the Ferranti rectifiers. There are three of these, each capable of supplying 40 lamps in series. The rectifier consists of a combined synchronous motor and double-break commutator, mounted on a slate table. One of the most conspicuous recent improvements is that the commutating arrangement, which heretofore was at both ends of the spindle which projected from the synchronous motor, is now placed at one end. Another distinct improvement which has been effected is the base of the apparatus is occupied by the constant current transformer, which maintains the current at 12 amperes throughout its whole range, viz., from one to 40 lamps. The movable coils of this transformer are supported on knife-edges, thus reducing the friction to a minimum.

In order to prevent a sudden load coming on the alternators in switching on the lamps, a water resistance switch is mounted on the right-hand side, and the lamp circuit is slowly closed through it, thus giving the engine time to take up the load. Current for the synchronous motor is supplied by the variable voltage transformer on the left, and is rectified for the fields of the motor by a separate small commutator. The whole arrangement, it will be seen, is very compact, and occupies very little floor space. The whole of the improvements that have been made in the apparatus are clearly shown in the illustration. The rectifiers are located on the floor of the engine room.

An earlier form of the Ferranti rectifier as used in the central station at Cardiff was illustrated and described in the ELECTRICAL REVIEW for January 2, 1895.

A Rochester Lineman Resuscitated.

Harry W. Sherman, for 14 years a lineman in the employ of the Rochester Gas and Electric Company, received a shock from a live wire at Rochester, N. Y., on August 28, and was apparently dead for six minutes when he recovered consciousness, after being subjected to the D'Arsonval treatment. His right hand and wrist were badly burned, but he was otherwise uninjured. The wire he came in contact with carried 1,600 volts, and it is reported that he received the full voltage by short-circuiting the line with his body.



FERRANTI RECTIFIER IN THE EDINBURGH CENTRAL STATION.

Underground Trolley on Eighth Avenue, New York.

It was rumored last week that the horse car line extending from Canal street to the Harlem River on Eighth avenue, New York city, would be equipped with an underground trolley system. It was said that an improved form of the Budapest system was under consideration. Ex-Senator George W. Plunkitt, 323 West Fifty-first street, New York, is said to be interested in the matter.

It is stated that a new company proposes to establish an electric lighting plant at Nebraska City, Neb.

Resolution on the Death of President Davis, A. S. M. E.

The American Society of Mechanical Engineers has passed the following minute and resolution:

The American Society of Mechanical Engineers desires through its council to spread upon the records of the society and of its council a minute expressive of the respect and regard which its members feel and seek to make public upon the sudden and untimely death from an accident of their colleague, Mr. E. F. C. Davis, president of the society.

The formal mould of memorial resolutions in which a corporate body ordinarily records its action seems inadequate for a proper voicing of the spirit which pervades the council in the presence of the death of one whom its members had known so well, and whom they had learned to admire and love. His wise and mature judgment, his business and professional knowledge, his conservative, yet energetic, counsel and his courteous consideration for others had made him one from whose administration of the society's affairs the highest hopes had been entertained.

Although with such grief the stranger intermeddleth not, yet the council would presume to express their heartfelt sympathy with those nearest and dearest to Mr. Davis, upon whom this blow has so crushingly fallen.

Resolved, That copies of this minute be furnished to the engineering journals, with a request that they give to it publicity in such a way that it may serve to convey to the profession something of the sorrow and regret with which the American Society of Mechanical Engineers has heard of their loss in the death of their president.

The people of Sea Cliff, Long Island, on September 10 will vote on the question of lighting the streets of the village by electricity.

ELECTRIC LIGHT FLASHES.

The electric light company at Northfield, Vt., is installing a new engine and boiler.

The Anthracite Electric Light and Power Company, of Pottsville, Pa., has asked for an injunction so that it may bid for city lights against the Edison company.

The Schuylkill Valley Illuminating Company is making extensive improvements both in the building and machinery of its electric lighting plant at Phœnixville, Pa.

The Monrovia, Cal., Electric Power Company has ordered a steel pressure pipe and a water-wheel of 100 horse-power capacity. Duarte and Arcadia will each have lights from this plant, it is stated.

The St. Paul, Minn., board of aldermen has passed a resolution ordering that electric arc lights of 2,000 candle-power be placed on all of the principal downtown streets. The city is now using gas.

The Municipal Electric Light Company, of Brooklyn, N. Y., has elected the following trustees: Matthew Dean, John Hills, James L. Jensen, Clement Lockitt, Bernard Gallagher, Ezra D. Bushnell and Henry E. Hutchinson.

An attempt was made recently to damage the electric light plant at Harvey, Ill. Emery was poured into all the oil-cups and bearings. Fortunately, the cups were all cleaned before starting up the machinery, when the emery was discovered.

The Edison Electric Illuminating Company of Brooklyn, N. Y., reports for July, including the Citizens' Illuminating, this year: Gross, $51,027; increase, $23,247; net, $20,633; increase, $10,835; surplus for dividends, $11,891; increase, $6,377.

George Bain, who was the only bidder, got the 20-year franchises for electric light, gas and telephone systems, sold by the city of Brookfield, Mo., recently. He agrees to give the town one-half of one per cent during the first 15 years, and two per cent the last five years, on the gross revenue.

At the annual meeting of the Boston, Mass., Electric Light Company directors were re-elected with the exception that Mr. Charles Lowell takes the place of the late Hugh O'Brien, and C. L. Lovering succeeds Moses Williams. Mr. Samuel S. Sias was re-elected treasurer and clerk.

The Massachusetts Gas and Electric Light Commissioners have concluded the hearing on the petition of the Boston Electric Light Company for approval of an issue of $250,000 new bonds, of which $50,000 is to refund floating indebtedness and $200,000 is for extension of plant. Decision reserved.

A commission appointed by the Massachusetts Supreme Court, consisting of ex-Governor William E. Russell, James Renfrew and Theodore C. Bates, has decided that the city of Chicopee must pay $27,000 for the plant of the local electric lighting company. The transfer is set for October 1.

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SPECIAL NOTICE TO ADVERTISERS.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue.*

***NEW ADVERTISEMENTS** should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, SEPT. 4, 1895.

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The advertiser who places his announcement in the pages of the ELECTRICAL REVIEW not only purchases space but publicity—publicity of a high and far-reaching quality—the kind that's valuable and business-bringing.

The electric car and the bicycle have nearly routed the horse, and many are the columns of newspapers filled with stories on the subject. The latest is to the effect that in the West they are turning horses out and tying placards to them which read: "He who feeds me can have me."

The Rev. Charles H. Buck, a Methodist clergyman of Bristol, Conn., recently preached a sermon in which he denounced the local trolley railroad company because it ran cars on its line to Lake Compounce on Sunday, and "expressed himself," as the newspaper reports put it, "that it was a hindrance to Christian growth in Bristol." Of course, Mr. Buck had a perfect right to express himself in this or any other way. We imagine that on these warm evenings it is pleasanter for Bristol people to take a refreshing ride on the trolley cars than it is to sit in a hot church and listen to a dry sermon. We suggest that Mr. Buck can meet the competition of the Sunday trolley by preparing a brilliant sermon and delivering it, by arrangement with the street railway company, at Lake Compounce next Sunday evening. Then the people would get the ride they seem to want and a sermon whether they wanted it or not.

INACCURACY OF THE ONLY ONE.

The *Electric Railway Gazette*, in its issue for August 24, 1895, said editorially:

"Two State conventions—those of the Pennsylvania and New York associations—will be held next week."

This was not, and is not, true. The fourth annual meeting of the Pennsylvania Street Railway Association will be held at Wilkesbarre on September 4 and 5. The next meeting of the Street Railway Association of the State of New York will be held at Albany on September 17.

In another place in the same issue, this publication illustrates an "80-ton electric locomotive," which it describes as follows: "It weighs 10 tons."

A cardinal principle of journalism—accuracy—seems to be unknown in the office of the paper which brags about being "the only weekly electric railway publication in the world." The street railway field must surely hope that the paper named above will always remain the only one of its kind.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

The stock market of the week up to Friday night was in the main strong. There was a material increase in values and a broadening of transactions which indicate that the market has been taken from the control of the professionals by monied interests, who are buying in discount of a maturity of the corn crop and the steady improvement in industrial conditions. The weakening of sterling exchange in the latter days of last week and on Monday caused a number of bull pools to start operations on a large scale. This drew into the market an avalanche of orders from London on Tuesday. On Thursday and Friday that center was a seller on a hardening of sterling exchange rates and the engagement of important amounts of gold for shipment. The action of the bond syndicate in depositing further large amounts of gold with the government in exchange for greenbacks, in order to maintain the gold reserve, was reassuring. Towards the last of the week there was some disposition to take profits. This caused a reaction in prices of one point. The undertone, however, was very firm, and a continuation of the bull movement next week is confidently expected. Trades of almost all descriptions are fairly healthy and no important setbacks were recorded in any quarter. Iron continues to boom, while cotton during the week has had a sharp advance.

The feature in the electrical stocks was General Electric. There appeared to be good buying in quarters that up to recently have been bearish. It is figured that the stock will show 2 per cent net for the year, and that on this basis 40 is not a dear price. The natural tendency of the stock is upward and it will undoubtedly respond with higher values. Good judges of the market look for 35 as the low level and 45 as the high point the balance of the year. The debenture bonds sold at 89⅝ to 90. There appears to be a steady although limited accumulation of these securities.

The general demand for the better class of bonds found expression in buying on quite an extensive scale of the first 5's and consolidated 5's of the Edison Electric Illuminating Company of New York. The latter was quoted at 103½ and the former at 109½ to 110. Brooklyn Illuminating 1sts sold at 112½.

Attention is called to American District Telegraph stock through indications of a somewhat more active market. At present it is in the 40's, and before the panic sold at 60 and 70. It has paid dividends on 38,500 shares of stock for 30 years. It has 30,000 subscribers and its wires pass 70,000 buildings. After the last dividend of 1 per cent the company had a surplus of $300,000.

The interest upon the scrip of the Westinghouse Electric and Manufacturing Company to September 1, 1895, was paid to holders of record of that date. Scrip books closed on

August 29 and were reopened on September 3.

I learn from a house which makes a specialty of inactive electrical securities, both listed and unlisted, that their market is exceedingly quiet. Quotations for the most part are based upon the intrinsic values of the properties. Most of the concerns do what might be called "a local business," and aside from securities which are held by supply companies, the stocks and bonds are mainly owned at home. These are regarded as a fair investment, and there is little or no disposition to part with them. Some of the stock has found its way into commercial centers, but is not present in sufficient volume to permit of a close quotation. This accounts for the absence of change, and it is only when there is an innovation in the dividend or other financial policy, resulting in sales, that any important change takes place. There is a certain capitalistic element which up to a year ago was commanded by this class of securities. Since that time it has been diverted to street railway stocks and bonds, owing to the prominence which they have taken in the investment world.

On the Boston exchange, Bell Telephone was firm to strong at 198 to 199. Erie Telephone lost 1 per cent in early transactions and later recovered. New England Telephone was firm at 89 @ 90. Electric Storage was strong at 45 @ 46½. There was a good demand for the stock. Westinghouse common was quoted at 36@36½ and the preferred 55@55¼.

BAIN.

New York, August 30.

The National Electric Light Association.

President Wilmerding has called a meeting of the Executive Committee of the National Electric Light Association, to be held in New York city, Tuesday, September 10, for the purpose of discussing the advisability of holding an electrical exhibition in connection with the next convention. The following is a copy of a letter sent by President Wilmerding to the electrical supply people:

GENTLEMEN: It has been suggested that an electrical exhibition be held in connection with the next annual convention of the National Electric Light Association, which will take place next May in New York. The Executive Committee of the association proposes to act very shortly on this proposition, but before doing so I feel that we should obtain an expression of opinion from those to whom we should look for the very essential features of such an undertaking, namely, the exhibitors. The intention is that in case such an exhibition is held, it shall be something of considerably more importance than any of the exhibitions that have been made in connection with previous conventions of this association; and unless we feel assured that there is a very general desire on the part of manufacturers to enter into such a project and to give it their hearty co-operation, we should prefer that the matter be dropped.

I should, therefore, esteem it a favor if you would reply, stating what your views in general on this subject are and whether there would be a reasonable chance of your taking part in such an exhibition.

Yours truly,
C. H. WILMERDING,
President.

New York, August 28, 1895.

OUR BOSTON LETTER.

This has been a great week for Boston. Great in hospitality, decorations and crowds, but small in the amount of business transacted. The Knights, in all the glory of their regalia, and the ladies in theirs, have captured staid old Boston more completely than the British were ever able to do, and everything else has sunk into insignificance as compared with the duty of their entertainment. To say that they have owned the town does not do justice to the situation. Not only the town, but all the inhabitants are their property, and in justice to the Knights it must be said that both seemingly enjoy the subjugation. Not for many years have the streets of Boston presented such a sight as was witnessed on Tuesday last, the day of the great parade, when half a million people turned out to do honor to the city's guests. For nearly five hours the procession wound its way through seried ranks of spectators, packed solid from curb to buildings, and greeted with volleys of applause from every vantage ground between the foundations and the roofs of every building along the line of march. It is an open question which presented the finer picture, the Knights, with their glittering regalia, waving plumes and beautiful banners, or the eager and expectant faces of the many thousands who gazed down upon them from either hand, amid the gorgeous display of bunting which draped every building from top to bottom. Electricity, as usual, did its part in the celebration, and at night the streets sparkled with the brilliant glow of electric lights clustered in all kinds of beautiful designs and colors. Thousands upon thousands of dollars were spent in electrical illumination, and some of the designs were marvels of beauty. Boston may be conservative, but when she undertakes to do a thing she does it well and her guests of this week will carry the memory of her hospitality and hearty welcome to their distant homes and no doubt keep a warm corner in their hearts henceforth for the old "Hub" and her people.

C. H. McKenney & Company, of this city, are doing a splendid business throughout New England in gas and electric fixtures, and with the opening of Fall trade are putting a number of novel and beautiful designs on the market, which must be seen to be appreciated. No branch of the electrical industry has seen such rapid development, from an artistic standpoint, as has that of interior lighting, and it is largely through the genius and enterprise of such concerns as the above that the beautiful lighting effects of the present day have been attained. That the appreciation of art in interior lighting is inherent in the American people is demonstrated by their constant efforts towards improvement in this line, and the ready market always at the disposal of the manufacturer, who is striving to meet their expressed demands and lead them still onward in the development of the art. That C. H. McKenney & Company have appreciated these facts is evident, not only from an inspection of their handsome show rooms on Washington street, but from the volume of trade they are handling, which tells the story in the most satisfactory manner.

H. G. T.

Boston, August 31.

An Interesting Lamp Case.

Judge Jerome last week sentenced Thomas Jones, of 329 Stanton street, to six months' imprisonment and Jeremiah O'Brien, of 402 East Tenth street, and John Tracy, of 213 Lewis street, to four months each in the penitentiary, for endeavoring to steal lamps from the Edison Illuminating Company of New York. It is the custom of the illuminating companies to give to their customers new lamps for those burned out and on Friday afternoon, August 23, O'Brien and Tracy brought a large box of burned-out lamps to the Twenty-sixth street station of the Edison company and, stating that they came from the Manhattan Club, asked to have them exchanged. As the Manhattan Club was not a customer of the Edison company, and, moreover, as a large part of the lamps were not Edison lamps, the request was refused. The men took the box to Broadway, where O'Brien was waiting with a truck, and while driving through Fourth avenue and the Bowery the three shied such lamps as were not Edison lamps at venders and passers-by, and in so doing hit one of the Edison employés who had been directed to follow the men. The Edison scouts who had been following them up, thinking that perhaps they would attempt to exchange the lamps at the Edison station in Duane street, notified the superintendent there and when Tracy and O'Brien arrived they met with a cordial reception. The men there represented that the lamps came from Child's restaurant in Cortlandt street. The police were notified and arrested Jones, who had remained outside the building awaiting developments, together with Tracy and O'Brien, who had been detained in the building. One of the latter made a break for liberty, but ran into the arms of a stout employé, who had been placed at the door in the event of such an emergency. As this is the first conviction for such an offense, it will be of interest to illuminating companies throughout the country.

Sacramento Electric Carnival.

We have received an invitation to be present at the grand electric carnival to be held in Sacramento, Cal., on September 9. It is to be a most novel and interesting demonstration, and is the more important because it celebrates the transmission of almost unlimited electric power from Folsom to Sacramento. This will admit of the city being transformed into a blaze of light on the night of the carnival, and arrangements have been made for electric arches, electric floats and brilliant illuminations that will be gorgeously beautiful. In the parade at night will be floats, bearing designs in lights of every color. The railroad shop employés will alone provide 12 grand floats. The native sons and daughters, who will be in Sacramento by the thousands on admission day, will participate in the parade, as will also the military and many civic societies. In fact, it is to be a grand affair, and will mark a new era in the history of the Capital City. An executive committee of prominent citizens has been appointed, with Hon. Joseph Steffens as chairman, and J. O. Coleman, director-general, and extensive arrangements are being made for the affair.

The Berliner Telephone Patent.

A press dispatch from Washington, D. C., under date of August 28, stated that government officials are considering further proceedings against the American Bell Telephone Company for the repeal of the Berliner patent. As the case now stands, the bill of the government has been dismissed by the Court of Appeals for the First Circuit, and under that judgment the Bell company has begun proceedings against several opposition telephone manufacturing companies. The present situation is of additional interest from a judicial point of view, because the case involves a consideration of the act of 1891 establishing Circuit Courts of Appeal.

On December 18, 1894, Judge Carpenter, of the Circuit Court, announced his judgment sustaining the prayer of the United States declaring the patent null and void. The case was appealed to the Circuit Court of Appeals, and on May 18 last Judges Colt, Putnam and Nelson united in reversing the judgment of Judge Carpenter and remanding the case to his court, with instructions to dismiss the bill, thus practically sustaining the validity of the patent.

By the terms of the act creating Circuit Courts of Appeal the judgment of those courts is final in all cases arising under the patent laws, except where the judges certify a case to the Supreme Court, or where the Supreme Court directs the case to be brought before it for review on a writ of certiorari. The telephone company is evidently inclined to accept the decree of the Court of Appeals as final, and is proceeding to enforce its claims under the patent. But the government representatives are quoted as saying that a case involving the question whether or not the United States has the right to sue for cancellation of a patent is vastly different from a controversy between two private parties over a patent right, and that upon that point an appeal will lie to the Supreme Court from the judgment of the Court of Appeals. And even if that ground should fail them they can sue for a review of the case on a writ of certiorari as provided in the law itself. Which method of procedure will be followed has not yet been finally settled, but it is asserted that the case will not be permitted to rest in its present condition.

Crocker-Wheeler Electric Company.

President S. S. Wheeler, of the Crocker-Wheeler Electric Company, Ampere, N. J., writes to the ELECTRICAL REVIEW as follows:

After a continuous run, excluding Sundays, of a thousand hours, we have almost caught up with our orders, which since our fire have been nearly twice as large as ever before. We have also nearly replaced our stock of parts and are therefore able to serve our customers with greater promptness than has recently been possible.

American Electro-Therapeutic Association.

The fifth annual meeting of the American Electro-Therapeutic Association began yesterday in the council room of the College of Physicians and Surgeons, of Ontario, Toronto, and continues through to-day and to-morrow.

TELEPHONE NEWS AND COMMENT.

The telephone line between Duncan and Garrison, Colo., is completed.

Work on the new telephone plant at Amherst, Mass., is progressing.

Work on the Providence Telephone Company's conduit in Pawtucket, R. I., is progressing.

The Sunset Telephone and Telegraph Company has issued a new reduced schedule for long-distance telephone service.

The New Hampton, N. H., Telegraph and Telephone Company have replaced their telegraph instruments with telephones.

A disastrous fire destroyed the office of the Rocky Mountain Bell Telephone Company at Bingham, Utah, on August 19.

The Southern Michigan Telephone Company wants a franchise at Three Rivers, Mich., to establish a central office for adjoining towns.

Manager Durant, of the Bell Telephone Company, says St. Louis will be connected by long-distance telephones with all the big cities by next Spring.

Manager O'Gara, of the local telephone exchange at Columbus, Ohio, has recently made numerous improvements in the service, including the addition of 12 new operators.

The Central Union Telephone Company has completed plans for its new exchange building at Toledo, O., and will spend $100,000 on the building and construction of conduits.

An explosion of gas in an unused conduit belonging to the Bell Telephone Company, of Detroit, recently blew up three manholes, injuring one person and causing considerable excitement.

The subway ordinance having passed the councils and become a law, Norfolk, Va., is expecting to have a fierce contention between the new and the old telephone exchanges for patronage.

The Bristol, Huntington & Richmond, Vt., telephone association are almost ready to say Hello. The wire is all up and they are said to be looking for the best instruments to complete the line.

The Bell Telephone Company, of Philadelphia, has instituted the graduated charge system of rentals, the cost to subscribers depending upon the number of calls used. The system is similar to that employed by the Metropolitan Telephone and Telegraph Company, of New York.

The local telephone war which has been raging at Nevada, Mo., all Summer between the Missouri & Kansas Telephone Company and the English & Haly company resulted in a cut by the former company of one-half of former rates—$1.50 per month for business houses and $1.10 for residences.

The war for lower telephone rates made by the subscribers of the Delaware & Atlantic Telephone Company has resulted in the organization of a new company at Chester, Pa. A charter will be applied for under the name of the Delaware County Telegraph and Telephone Company. The capital stock has been fixed at $25,000, and the probable rate per year will be $30, a reduction of $20. The incorporators are Ward R. Bliss, Major J. H. Kerlin, H. V. Smith, I. E. Cochran, Jr., and Joseph Deering.

The Missouri & Kansas Telephone Company have submitted a proposition to furnish telephone service in Wichita, Kas., at a rate of $36 per annum for business houses and $30 for residences, instead of the old rates of $60 and $50 for business and residence telephones, respectively. Other telephone companies have offered to furnish telephone service at the rate of $1 to $1.50 per month. The penalty of $25 per day on each telephone used by the company, without paying the heavy license tax recently assessed, continues to pile up at the rate of nearly $7,000 per day.

The Inter-State Telephone and Telegraph Company, which is principally owned and officered by Durham, N. C., business men, has recently purchased the Harrison telephone plant at Durham. The officers of the reorganized company are as follows: L. A. Carr, of Durham, president; Julian S. Carr, of Durham, secretary and treasurer; W. W. Shaw, of Durham, auditor, and Edgar L. Miller, of Maryland, general manager, assisted by George P. Lowe, superintendent of construction, and Harry Stone, instrument man, with an able corps of workmen. The directors are L. A. Carr, Julian S. Carr and George W. Watts, of Durham, and Dr. P. D. Fahrney and James E. Walker, of Maryland.

Although the Elizabeth, N. J., Telephone Company some time ago got a franchise from the City Council to build an opposition local line to the New York & New Jersey company, at Elizabeth, the new enterprise for some reason lags and no vigorous effort is being made to go ahead with the work of construction. It is rumored, says the New York *Tribune*, that the new company has not got the required capital on hand, and that this is the real cause of the trouble. It has given rise to speculation whether the Elizabeth company will follow the footsteps of the companies organized in Rahway, Cranford and other places to build local opposition lines to the old company, but which, so far, have made no progress whatever.

The Depths of Space.

Sir Robert S. Ball, in a recent popular article on astronomy, published in the New York *Sun*, gave the following interesting facts in demonstration of the distance of stars from the earth:

I do not here propose to state the distances of the stars in miles. No doubt strings of figures for this purpose might be written down, and they have, of course, a value in their proper place. Instead of repeating such figures, I shall endeavor to translate them into ideas more suitable for conveying a due appreciation of the magnitudes involved. The electric telegraph will supply an illustration for the purpose. The actual velocity attained in telegraphic practice varies according to circumstances. The electrician, however, knows that, even when all the circumstances are most favorable, the speed of a current along the wire could never exceed 180,000 miles a second. We shall employ this maximum speed as the velocity of electricity in our present illustration.

Just consider all that this implies. Suppose that a row of telegraph posts 25,000 miles long were erected round the earth at the equator. Suppose that a wire were stretched upon these posts for this circuit of 25,000 miles, and that then another complete circuit was taken with the same wire around the same posts, and then another and yet another. In fact, let the wire be wound no fewer than seven times completely about this great globe. We should then find that an electric signal sent into the wire at one end would accomplish the seven circuits in one second of time. Provided with this conception we can now give suitable illustrations of the results at which astronomers have arrived in their researches on the distances of the stars.

Let us suppose that the telegraph lines, instead of being merely confined to the earth, were extended throughout the length and depth of space. Let one wire stretch from the earth to the moon, another from the earth to the sun, another from the earth to the nearest bright star, another from the earth to a faint telescopic star, and finally let a wire be stretched all the way from the earth to one of the more distant stars. Let us now see what the very shortest time would be in which a message might be transmitted to each of these several destinations. First, with respect to the moon, our satellite is, comparatively speaking, so near to us that but little more than a second would be required for a signal to travel thither from the earth. The sun is, however, many times further away than the moon, and the time required for sending a message to the sun would be correspondingly longer. The sun is indeed so far that when the key had been pressed down, and the electric wave had shot forth along the solar wire to pursue its route at that stupendous speed which would permit it to place a girdle seven times around this earth in a second, yet eight minutes would have to elapse ere the electric wave, notwithstanding its unparalleled velocity, had passed from the earth to the sun. An answer sent back from the sun would require another eight minutes for the return journey, so that if there were no undue delay in the solar Post Office, we might expect a reply within half an hour or so after the original message had been dispatched.

Telegraphing to the stars would, however, be a much more tedious matter. Take first the case of the very nearest of those twinkling points of light, namely, Alpha Centauri, to which I have already referred. The transmission of a telegraphic message to this distant sun would indeed tax the patience of all concerned. The key is pressed down, the circuit is complete, the message bounds off on its journey; it wings its way along the wire with that velocity sufficient to carry it 180,000 miles in a single second of time. Even the nearest of the stars is, however, sunk into space to a distance so overwhelming that the time required for the journey is not a question of seconds or of minutes, not of hours, not of days, not of weeks nor even of months, for no less than four years would have to pass by before the electricity, trembling along the wire with its unapproachable speed, had accomplished this stupendous journey.

Alpha Centauri is, however, merely the nearest of these stars. We have yet to indicate the distances of those which are more remote. Look up to-night toward the heavens, and among the thousands of twinkling points which delight our eyes there is many a one up there so far off that if, after the battle of Waterloo had been won in 1815, the Duke of Wellington had telegraphed the news to these stellar depths, the message would not yet have been received there, notwithstanding the fact that for 80 years it has been flashing along with that lightning velocity which would carry it seven times round the earth in the interval between the two ticks of a clock.

There are stars further still. Fortify your eyes with a telescope and direct it toward the sky. Myriads of stars will then be revealed which would not be discerned without its aid. Nor need we feel surprised that the effulgence of glorious suns, as these spheres undoubtedly are, should shrink to such inconsiderable proportions when we think of the awful remoteness of these bodies. Over our heads there are thousands of stars so remote that if the news of the discovery of America by Columbus had been circulated far and wide through the universe by the instrumentality of the telegraph, these thousands of stars, to which I now refer, are elevated into boundless space to altitudes so stupendous that the announcement would not yet have reached them.

And we have still one more step to take. Let us think of the telegraph wire that is supposed to run from the earth to one of those stars which are only known to us by the impressions they make on a photographic plate. It seems certain that many of these stars are so remote that if the glad tidings of the first Christmas at Bethlehem, 1,894 years ago, had been disseminated through the universe by the swiftest electric current ever known, yet—those stars are so inconceivably remote—all the seconds which have elapsed in the 1,894 years of our present era would not have sufficed for the journey.

The tower which is being erected on the building of the Home Telephone Company at Mobile, Ala., is nearing completion and, with the exception of church steeples, will be the highest tower in the city. It is built of angle iron and will be 134 feet from the street level. From the top of the tower 100 pairs of wires will run to the offices of subscribers in the outlying business district without the support of poles. Superintendent Minnis says the company will soon have their lines in operation.

THE CHOICE OF TRANSFORMERS.

READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, CHICAGO, JULY 17, 1895, BY D. C. JACKSON.

The public data which are available for forming an opinion of the comparative economy of transformers are very meagre. The little—which is obtainable—is to be found in a great measure in the advertising circulars of manufacturers, and while these results, being tests of their own and of rival makes, are often entirely reliable, such *ex-parte* data are unsatisfactory to a careful purchaser. In order to place before you independent data representing all the American transformers of moderate capacities I will give the results of a long and carefully carried out series of tests made by Mr. A. H. Ford in the laboratory of the University of Wisconsin. For these tests transformers of 1,500 watts capacity, as nearly as possible, were procured directly from the manufacturers within about a year from this date, so that the tests may be presumed to represent the latest and best designs which are now supplied. These transformers are from the most prominent makers and, in fact, include all important makes of American transformers with two or three exceptions. The results of the tests are given in the attached table. (Table 1.) These results, I find, do not differ very widely from those published by the Fort Wayne Electric Corporation in a small blue-printed pamphlet, which, however, contains tests made by the company upon only a few of the makes of transformers included in my table.

The data for each transformer are given for tests upon two frequencies —125 and 60 periods per second, respectively. Efficiencies have been calculated, and are given in the table for each transformer, when operated upon each frequency continuously at full load and also when operated at an assumed load, which may be taken as an approximation to the average load found on good stations operating 24 hours. The latter are called "all day" efficiencies and are calculated as though the transformers ran 19 hours out of the 24 on no load and five hours on full load.

A comparison of the losses of the different transformers and the efficiencies shows in most cases that the transformers, with the smallest iron losses, give the highest "all day" efficiencies. The effect of the iron loss on the working efficiency depends upon the length of time the plant runs. The waste of power due to the iron loss in the transformer continues as long as current is fed to the primary circuit, consequently a plant, which only runs six hours per day, will only waste one-quarter of the power by the iron loss of its transformer that it would if operated 24 hours per day. The actual number of watt hours used by the customers of the plant might not differ very greatly in the two cases, yet the output of the station when run 24 hours might be much greater than when run six; the former difference being due to the difference in the amount of power wasted in the transformers. It is, therefore, evident that extreme care in the selection of the best transformers to be used on an alternating plant, which runs all day, may be of the greatest advantage. The lower the frequency of the alternating current which is used, the greater are the returns coming from this care likely to be.

Let us compare transformers Nos. 3 and 4 as given in the table. These are both made by well-known manufacturers. The copper losses at full load do not differ very much, what difference there is being in favor of No. 4. At average loads there would be considerably less difference in these two points.

The iron losses, which go on regardless of the load as long as current flows in the primary winding, differ very greatly even if we take three-fifths of the loss in No. 4 as the losses of a 1,500-watt transformer of that type. Let us suppose that these transformers are placed on a plant which supplies current 24 hours each week-day and 12 hours on Sunday, which makes a total of 8,136 hours per year that current would flow in the primary winding of the transformers, and the total number of watt hours wasted by the two transformers is shown below:

$f = 125$

Transformer No. 3, 8,136 x 32 = 262,000.

Transformer No. 4, 8,136 x 80 = 651,000.

$f = 50$

Transformer No. 3, 8,136 x 46 = 374,300.

Transformer No. 4, 8,136 x 140 = 140,000.

In a station which turns out a kilowatt hour for each eight pounds of coal burned (and this in Wisconsin requires the station to be well arranged and the use of coal that costs two dollars and a half or more) transformer No. 4 requires the buying of about a ton and a half of extra coal every year when operated at a frequency of 125; therefore it costs, other things being equal, upwards of four dollars per year more to operate than No. 3. It would, therefore, pay well, if other things are equal, to buy transformer No. 3, even if its first cost were many dollars greater than that of No. 11. The difference between the transformers is even greater when the frequency is 60.

For every 100 transformers of the types here compared the generator plant that supplies current to No. 4 must be of five kilowatts greater capacity than that required for No. 3, which means an increase of three per cent in the generating plant; that is, a plant of a given size which supplies transformer No. 4 must have a capacity for supplying current greater by three per cent than if transformer No. 3 were used.

The difference between these two transformers is largely due to differences in the relative amounts and arrangement of the iron and copper, the cores and windings and the magnetic quality of the iron ore. The standing of the manufacturers renders it probable that the transformers are of equal durability and reliability but the regulation of No. 4 is better. The regulation question, which should be carefully considered, makes a serious deduction from the claims of No. 3 to first place in the comparison.

Differences sometimes occur between transformers of the same size and same make which are not as great as the differences here shown to exist between Nos. 3 and 4, but are sufficiently great to seriously affect their economy. In order to husband the capacity of plant and to save in operating expenses it is, therefore, of importance not only to test transformers of different makes which are presented for sale, but to test each transformer which is put on the line. This may be easily and expeditiously done. To get the iron losses the secondary coil of a transformer should be connected to the regular lighting circuits with an ordinary wattmeter included, and the circuit of the primary coil should be left open. The reading of the wattmeter shows the number of watts which are wasted by the iron loss.

A wattmeter such as is required for these measurements costs from 40 to 70 dollars and is an instrument that, like the steam engine indicator, pays to have at hand for proper use. However, if the regular wattmeter is too expensive to buy, an ordinary Thomson recording wattmeter, provided a sufficiently sensitive and reliable one is at hand, may be used in place of it, and the record reduced to the basis of one hour. It is needless to say that instruments which are used in such tests as are here proposed, must be fairly reliable.

To test the copper losses in a transformer, the quickest and easiest method, which is approximately accurate, is to connect the primary coil of the transformer in series with some resistance (iron wire or lamps) to the alternating incandescent circuit, and short circuit the secondary coil of the transformer through an amperemeter. The resistance should be adjusted until the full load current of the transformer flows through the amperemeter. The reading of a wattmeter so connected in circuit with the primary coil gives the copper loss approximately.

The drop in pressure in a transformer may be measured by connecting the transformer to the lighting circuits and reading the primary and secondary pressures by voltmeter. The transformer may then be loaded by lamps and the pressures again read when the drop is at once seen. One voltmeter may be used for this, but two are more convenient.

For the testing of individual transformers as they are delivered and before they are put on the lines, all the instruments which are required are already in the possession of the electric stations with the exception of a wattmeter, and this is not a serious deficiency, since, if necessary, a Thomson recording wattmeter may be used instead. The testing need take but little time and is likely to result, in average stations, in the saving of considerable wastes.

Proper records of his transformer tests enable a station manager to determine at once the amount of saving that he may make by replacing certain small transformers by one large transformer. If tests are not made such changes may not bring the results expected, since a number of first-rate small transformers may be replaced to no advantage by a large transformer if the latter is not a good one; but usually a large transformer, if one of the best, is more desirable than several small ones whether they are good or bad.

For your guidance in selecting transformers, I will give you the following data, contained in a table made out by Professor Ryan. The table gives the leakage currents which should flow in the 1,000-volt primary of good transformers when the secondary circuits are open.

Watts capacity.	Leakage current.
1,000	.035
2,000	.080
6,500	.100
17,500	.200

When the low pressure coil is connected to a 100-volt circuit the leakage current may be expected to be 10 times as great.

For intermediate capacities, intermediate values of the open circuit or leakage current may be expected. I will add to this the values of the iron loss which should not be exceeded in thoroughly good transformers.

Watts capacity.	Iron loss.
1,000	30
1,500	40
2,000	50
2,500	60
4,000	80
6,500	100
17,500	150

The copper losses in transformers of all sizes should never exceed three and a half per cent at full load and ought to be between one and a half and two and a half per cent. The total drop in secondary pressure, due to loading a transformer, if the primary pressure is kept constant, ought not to exceed three and a half per cent.

TABLE I.—RESULTS OF TRANSFORMER TESTS.

No.	Watts capacity.	Open circuit current.		Watts iron loss.		Watts copper loss full load.	Total pressure drop.	Efficiencies full load.		All day.	
		F=125	F=60	F=125	F=60			F=125	F=60	F=125	F=60
1	1,250	.043	.066	37	48	30	2.5	95	94	85	83
2	1,500	.076	.124	50	71	45	3.5	95	94	85	81
3	1,500	.052	.100	32	46	38	4.0	96	95	89	85
4	2,500	.230	.540	135	230	44	2.5	92	89	77	68
5	1,800	.076	.600	53	109	67	5.0	94	92	85	75
6	2,000	.055	.091	42	56	55	5.0	95	94	89	86
7	1,000	.028	.064	24	28	33	3.0	95	94	87	86
8	1,500	.073	.113	57	76	31	2.5	94	93	83	79
9	1,500	.077	.144	43	55	28	3.0	95	95	86	84

RESPIRATION, SUFFOCATION AND RESUSCITATION.

THE MAIN PHYSIOLOGICAL FACTORS WHICH PLAY THE RÔLE IN RESPIRATION, SUFFOCATION AND RESUSCITATION, AND THE AUTHOR'S METHOD OF PNEUMATIC ARTIFICIAL RESPIRATION.

BY J. MOUNT BLEYER, M.D., F.R.A.M.S. (NAPLES, ITALY), OF NEW YORK CITY. ORIGINAL COMMUNICATION TO THE ACADEMIA DE CIENCIAS MEDICAS, FISICAS Y NATURALES DE LA HABANA, 1895.

Laryngologist to the German West-Side Clinic; Membre de la Societe Francaise de Otologie de Laryngologie et de Rhinologie, Paris; Membre National Academy of Medicine, Mexico; Membre de la Societe Francaise D' Electrotherapie, Paris; Member of the American Medical Association, etc.

(*Continued from page 122.*)

One cannot try experiments on human beings as on animals, but accident and disease frequently furnish us with experiments made to our hand. What has been related of the birds, is confirmed by an accident which befell two young Frenchwomen. They were in a room heated by a coke stove. One of them was suffocated, and fell senseless on the floor. The other, who was in bed, suffering from typhoid fever, resisted the poisonous influence of the atmosphere, so as to be able to scream till assistance came. They were both rescued, but the healthy girl, who had succumbed to the noxious air, was found to have a paralysis of the left arm, which lasted for more than six months. Here, as in the case of the sparrows, we find the paradoxical result to be, that the poisonous action of a vitiated air is better resisted by the feeble, sickly organism than by the vigorous, healthy organism. This paradox admits of physiological explanation. In the vitiated air of a German Kneipe, or other similar places, as in that of the houses of the poor, we find those who have had time to adjust themselves to it, breathing without apparent inconvenience, although each new-comer feels the air to be vitiated; and because they "get accustomed to it," people very naturally suppose that no injurious effect can follow. Here lies the dangerous fallacy. They get accustomed to it indeed, and only because they do so are they contented to remain in it. But at what price? By what means? By a gradual depression of all the functions of nutrition and secretion. In this depressed condition less oxygen is absorbed and there is less needed in the atmosphere. A vitiated air will suffice for the respiration of a depressed organism, as it would amply suffice for the respiration of a cold-blooded animal. When we enter a vitiated atmosphere, our breathing becomes laborious; the consequence of this is a depression of all the organic functions, and then the breathing is easy again, because we no longer require oxygen, and we no longer produce so much carbonic acid. Were it not for this adjustment of this organism to the medium by a gradual depression of the functions, continued existence in a vitiated atmosphere would be impossible; we see the vigorous bird perish instantaneously in air which would sustain the enfeebled for upwards of an hour. Thus does Physiology explain the paradox; but at the same time it points out the fallacy of supposing that bad air can be harmless because we "get accustomed" to it. However fortunate a circumstance for those who have to breathe bad air, that the organism is quickly depressed to such a point as to render such air respirable, no one will deny that depressions of this kind are necessarily injurious, especially when frequently experienced. There is indeed a wonderful elasticity in the organism, enabling it to adapt itself to changing conditions; but a frequent depression of functional activity must be injurious and fatal if prolonged. It is interesting to observe the gradual adjustment of the organism, as contrasted with one less gradual. The longer the time allowed, the easier is the adjustment. These examples are often witnessed in workmen whose task it is to do labor in such places where the air is entirely laden down with poisonous gases, etc. Thus a bird will live three hours in a certain quantity of air; in the same quantity, two birds of the same species age and size, will not live one hour and a half, as might be supposed, but only one hour and a quarter. Conversely, the bird which will live only one hour in a pint of air will live three hours in two pints. Enlightened by these remarkable results, we shall now be able to regard respiration as a physiological function rather than as a simple physical process. On more than one occasion we have had to protest against the tendency to explain vital phenomena by physical and chemical laws only, without regard to the order of conceptions specially belonging to vital phenomena; and we must repeat that protest in the present case. That respiration is ultimately dependent on physical laws no one thinks of disputing; and in the arduous endeavor to detect the operation of those laws, it is natural that men should neglect the still more difficult studies of vital laws. But we think it can be shown that, however far analysis may trace, the operation of the laws of gaseous interchange and diffusion, and the condensing action of moist membranes, those will only conduct us to the threshold; they will never open for us the temple. These physical laws reveal only one part of the mystery. Respiration is not a simple physical fact. It is the function of a living organism, and as such receives a specific character from that organism. No sooner do we cease to regard the exclusively physical aspect of this function, no sooner do we fix our attention on the organism and its influence, than the whole theory we have raised on the laws of gaseous interchange suddenly totters and falls.

It seems easy to explain why warm-blooded animals cease to breathe in an atmosphere charged with a certain percentage of carbonic acid, although there may still remain sufficient oxygen to permit a candle to burn in it, and even to permit continued respiration if the carbonic acid be removed. The presence of a certain amount of carbonic acid in the air prevents the exhalation of that gas from the blood. As we read the explanation nothing can seem clearer, and we admire the skill with which the laws of the absorption of gases are brought to bear on the fact. But as we pursue our researches various difficulties arise, and as we extend the inquiry from the respiration of warm-blooded to that of cold-blooded animals, we learn that the fact so luminously explained is not at all true of the simpler organisms. Let us for a moment consider one striking contradiction in the theory. The air which has once passed through the lungs of a man, and which in losing four or five per cent of its oxygen has become charged with three or four per cent of carbonic acid, will yield but very little of its remaining oxygen when again passed through the lungs; and if this air be breathed over and over again until the sense of suffocation forces a cessation, the air will still be found to contain 10 per cent of oxygen—that is to say, nearly half of its original quantity. In air thus vitiated the respiratory process is impossible, but only impossible for warm-blooded animals in health. Frogs, reptiles, fish and mollusks, instead of perishing when the air has lost about half its oxygen, continue to breathe and to absorb oxygen almost as long as there is any left. Spallanzani, Humboldt and Matteucci have placed this beyond a doubt by their experiments, and when we consider how long these experiments have been before the world, it is a matter of surprise that the contradiction they give to all the purely physical theories of respiration has not been insisted on. If the process depends simply on the proportion of gases in the atmosphere, how is it that one animal can continue to breathe in an atmosphere irrespirable by another? If it be simply the interchange of oxygen and carbonic acid, and this interchange be frustrated whenever 11 per cent of oxygen has disappeared, the law must be absolute, and as applicable to reptiles and mollusks as to birds or mammals. Instead of this we find that reptiles can continue to breathe long after such a limit has been passed. They continue to absorb oxygen as long as even only three per cent remains, in spite of the continually increasing proportion of carbonic acid. How is it that the physical laws of absorption frustrated the respiration of one class of animals and were powerless with another class? Why is it that when a bird and a frog are confined in the same vessel the frog will continue to absorb oxygen from the vitiated air in which the bird has long perished? Clearly, the cause of this difference lies in the difference of the organism, and we must no longer seek in the mere quantities of gases an explanation of interrupted respiration; we must no longer say that "breathing becomes impossible when the air is charged with a certain amount of carbonic acid because that amount prevents the gaseous interchange"; but we must say that such an amount prevents the gaseous interchange because it interferes with the organic action of the pulmonary apparatus. The distinction becomes palpable when we have an organism which is not affected by this amount of carbonic acid, and is even more palpable when we see a warm-blooded animal capable of breathing for a long period the air which under a different condition it would find irrespirable. We have seen how a bird with its functions depressed can continue to breathe for an hour in an atmosphere which immediately suffocated another bird of the same species, whereby it became clear that the lungs of one warm-blooded animal could absorb oxygen from an atmosphere in which there was such a proportion of carbonic acid that sufficient oxygen could not be absorbed by a vigorous animal of the same species.

The intervention of organic conditions, modifying the simple physical laws of gaseous exchange, is sufficiently evident from what has just been said; but we have as yet no clear insight into the nature of this intervention; we do not know why blood, charged with carbonic acid, cannot in the one case exchange that gas for oxygen, of which 10 per cent still remains, since in another case the same blood can effect the exchange when there is even less than 10 per cent of oxygen. Atmospheric air contains only 21 per cent of oxygen. But if 50 per cent of oxygen be mixed with 50 of carbonic acid, a warm-blooded animal is suffocated in it, in spite of there being more than double the amount of oxygen there is in ordinary atmosphere. Bernard, who made the experiment, thinks that the carbonic acid in this mixture prevented this oxygen from entering the blood, not only because of its greater solubility, which gives it a tendency to displace the oxygen, but also because of the obstacle it presents to the exhalation of carbonic acid. On the other hand, the extensive and careful experiments of Regnault and Reiset show that respiration will take place quite well in an atmosphere which contains as much as 23 per cent of carbonic acid, if at the same time it contains as much as 40 per cent of oxygen. How are we, on physical principles, to reconcile such facts as those just cited? In the one case we see that 50 per cent of oxygen is insufficient if the amount of carbonic acid be also 50 per cent; in another case we see that 40 per cent of oxygen suffices if the carbonic acid do not exceed 23 per cent; and we could explain both by saying, that unless the amount of oxygen nearly doubles that of carbonic acid, respiration is impossible, were it not that reptiles breathe in an atmosphere which has become charged with carbonic acid, and has gradually lost all but three per cent of its oxygen.

We have raised difficulties which we cannot pretend to remove. It is enough to have called attention to the physiological problem involved as a justification of our skepticism in presence of the physical explanations. Respiration is not a simple interchange of gases, but an organic function, which chiefly consists in exhaling carbonic acid and absorbing oxygen. Whatever interferes with the exhalation of the absorption, checks respiration, no matter what may be the condition of the atmosphere. As a final proof of the correctness of this conception, we will add that oxide of carbon, by preventing the exhalation of carbonic acid from the blood, prevents all respiration whatever amount of oxygen may be in the air. Moreover, experimenters are now agreed that there is no accurate correspondence between the amounts of oxygen absorbed and carbonic acid exhaled, as there ought to be were the process one of simple exchange. Spallanzani placed four couples of snails in four separate vessels containing atmospheric air; he found that two of these couples absorbed 20, one 19½, and the fourth only 17 of oxygen, but the amount of carbonic acid exhaled was strikingly at variance. In two vessels he found 20 and 17 of oxygen replaced by 3 of carbonic acid; in two others, 20 and 19½ by 4 and 8 of carbonic acid; clearly showing that the exhalation had been one process and the absorption another.

If we gained some idea of respiration, we shall be able to understand what suffocation is, and why carbonic acid in the air is so injurious. Carbonic acid is not a *poison*, as was formerly maintained. Its accumulation in *the blood* is only fatal where there is such an accumulation *in the atmosphere* as prevents its *exhalation*; its mere presence seems to be quite harmless even in large quantities, provided always that it is not retained there. Carbonic acid when absorbed into the blood, which is alkaline, cannot there exert its instant action as an acid because it will either be transformed into a carbonate or be dissolved. Bernard has injected large quantities into the veins and arteries and under the skin of rabbits, and found no noxious effect ensued. The more carbonic acid there is in the blood, the more will be exhaled, provided always that the air be not already so charged with it as to prevent the exhalation.

Oxide of carbon seems, however, to be a true poison. The blue flame which rises from the coals or lighted wood is this same oxide, the product of an imperfect combustion; and being notoriously poisonous, it has by some writers been selected as the

real agent in those numerous deaths by asphyxia, which have occurred from voluntary and involuntary exposure to the fumes of charcoal in closed chambers, etc. Other methods could have been selected, but one is sufficient for illustration. Carbonic acid was said to be innocent, and oxide of carbon had to bear the whole infamy. There is no doubt, however, that although carbonic acid is not a poison, it will produce asphyxia, and deaths from charcoal fumes may occur either from this asphyxia or from poisoning by oxide of carbon, or from a conjunction of the two. Oxide of carbon is truly called a poison, because its action is deleterious even in slight doses, no matter what may be the state of the atmosphere; but carbonic acid is only deleterious when the quantity in the atmosphere is such that the absorption of oxygen is frustrated. But how does this oxide of carbon act? If venous blood be exposed to it, we see at once the change into scarlet blood takes place. It acts on the blood like oxygen? you will ask. Not precisely; for if venous blood be exposed to oxygen, it becomes scarlet; but when left to itself, it becomes black again (except on the surface), probably because the oxygen has gradually formed carbonic acid. After exposure to oxide of carbon, the blood remains scarlet for days and days, nay, even for weeks, according to Bernard. Prussic acid acts in a similar manner. Poisoning by prussic acid or oxide of carbon may be detected by this scarlet color of the venous blood.

The effect of oxide of carbon is to render the blood disks incapable of that process of exhalation, on which, as we have seen, the activity of the organism depends. The blood, to all appearances, preserves its vitality, for neither the form nor the color of its disks is altered; but the blood is really dead, because its restless changes are arrested. Ever wonderful is the fact, constantly obtruding itself upon us, that life is inseparably linked with change and that every arrest is Death. Only through incessant destruction and reconstruction can vital phenomena emerge, an ebb and flow of being. The moment we preserve organic matter from destruction we have rendered it incapable of the restless strivings of life. A spirit like that of Faust seems ranging through all matter, and if ever it should say to the passing moment, "Stay! thou art fair," its career will be at an end.

The reader has doubtless often heard with surprise that the rusting of iron, the burning of a candle and the breathing of an animal are only three forms of the same process, three names for combustion or oxidation. There is a certain fascination in such generalization, and one always regrets to find them not correct. The rusting of iron and the burning of a candle are indeed two forms of one oxidizing process, but respiration can no longer be considered as in any sense a process of combustion; it is a twofold process of exhalation and absorption. The interesting experiments of Priestley will enable us to set forth the differences between respiration and combustion. He placed mice into a bell-glass, where in due time they were suffocated by the air which they had vitiated; other mice were introduced, and they expired immediately. In another bell-glass a candle went out, after having in its combustion absorbed a part of the oxygen; another burning candle was introduced, and it was at once extinguished by this vitiated air. In both of these vessels some mint was placed, where it flourished, and so completely revivified the air by absorbing its carbonic acid and giving out oxygen, that mice could again breathe in the one, and a candle burn in the other. In these experiments we seem to have a demonstration of the identity of combustion and respiration and this, indeed, was the conclusion drawn; but that the conclusion is erroneous, appears from the experiments of Claude Bernard, who takes a bell-glass containing an atmosphere of 15 per cent of oxygen, and two per cent of carbonic acid—the rest of the oxygen having disappeared to form water with the hydrogen of the candle which had just gone out. In this atmosphere, in which a candle will not burn, a linnet will breathe at ease for some time. He reverses the experiment and makes an atmosphere in which a candle will burn, but in which an animal instantaneously perishes—an atmosphere composed half of oxygen and half of carbonic acid, in which a candle will burn better than in the air, because, in spite of the amount of oxygen, that oxygen cannot be absorbed. The bird, when about to expire in vitiated air, will be recalled to life if the carbonic acid be removed by the introduction of potash, showing that it is owing to the presence of this carbonic acid that respiration is impeded; but we cannot thus restore the expiring flame of the candle by removing the carbonic acid. Take two bell-glasses, and as soon as the combustion grows feeble, introduce into one glass some potash to remove the carbonic acid; you will, nevertheless, find that the candles in both glasses will go out at the same instant. The experiment is very simple, and its significance is plain. By it we see the difference between combustion, which is only oxidation, and respiration, which is not oxidation but exchange. In the combustion of a candle the oxidation is everything, and no process of exchange takes place. In the breathing of an animal the exchange is everything. The candle expires because there is not enough oxygen in the air; the animal expires because there is too much carbonic acid in the air.

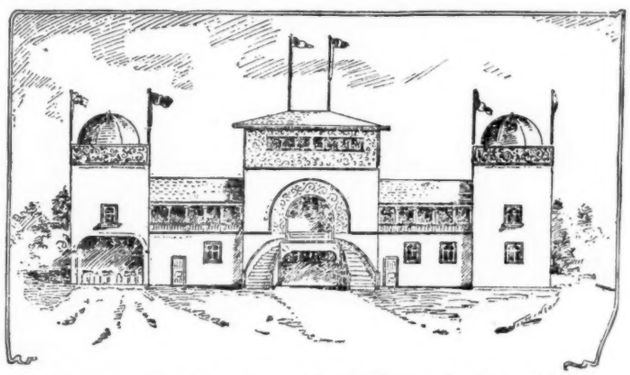
Further, to prove that Respiration is an exchange of gases in the lungs, and not a process of oxidation, we need only refer to the experiments of Spallanzani and W. Edwards—experiments so celebrated that one is amazed to find one's self citing them in this discussion, which they ought long ago to have closed. These physiologists found that cold-blooded animals will breathe in an atmosphere of pure hydrogen, almost if not quite as easily as in ordinary air; the carbonic acid is exhaled and hydrogen absorbed.* This proves that carbonic acid pre-exists in the blood, and is not formed during respiration by the oxygen as it enters, and proves, likewise, that the respiratory process is one of exhalation and absorption, which can take place as well with hydrogen as with oxygen; and we are thus forced to exclude the idea of oxidation altogether. Although respiration can take place without oxygen, life will not long continue without it; for, as before stated, oxygen is the power which burns organic matter into life.

(To be continued.)

* The same is true of warm-blooded animals when newly born, but after they have breathed for a few hours, they no longer possess this capability. The reason is unknown.

The Atlanta Consolidated's Terminal Station.

The Atlanta Consolidated Street Railway Company, of Atlanta, Ga., is making extensive plans to take care of the great crowds which will visit the Cotton States and International Exposition, opening on September 18 and continuing through December. One of the most important features of these plans is the building of a terminal station at Piedmont Park, where the exposition will be held. A front elevation of the terminal is shown in the accompanying illustration. The design of the building is in keeping with the rest of the buildings of the exposition and is most attractive in its appearance.



The Atlanta, Ga., Consolidated Street Railway Company's Terminal Station in Piedmont Park.

The station will be two stories high and the interior construction will be almost circular in form. The cars will run in on one side of the circle, unload their passengers and then pass around to the opposite side of the circle where passengers going to the city will be taken aboard. The doors of the terminal are reached by large corridors, by which the passenger can take the particular car that is to bring him to his destination. When the ticket is presented at the turnstile he is admitted to the cars in front of that particular section which he wishes to enter. If he wants to take a cross-town car he will walk down the corridor until he reaches the door that has the street printed over it.

The main terminal of the road will be located just at the entrance of the exposition grounds at the Wilson avenue entrance and will be entirely under a shelter while the passengers are being unloaded and loaded. The terminal will be one of the most convenient of all the arrangements made at the grounds and the accommodations made for the travel of passengers will be greatly felt when the rush begins and the wisdom of this move is appreciated.

Electric Railway Extension in Philadelphia.

The Electric Traction Company, of Philadelphia, has received 28 new cars for use on the new Holmesburg, Tacony & Frankford division, which are so constructed that in Winter time the motormen and conductors both will be protected from severely cold weather. The line upon which these cars will run has just been put in operation. It is the longest extension yet made by the system and runs from the Pennsylvania Railroad station in Frankford to the county line, through Tacony and Holmesburg. In Frankford it connects with both divisions of the Electric Traction, and it is the intention to carry passengers from the county line to any point in the city reached by the Electric company for 13 cents. From the terminus of the road to Chestnut street is about 15 miles.

New Orleans Traction Company's Injunction Vacated.

Justice Stover, of New York, has signed an order vacating the temporary injunction obtained on May 20, by H. B. Hollins & Company, restraining the New Orleans Traction Company and J. & W. Seligman from paying the interest or principal of notes, aggregating $130,000, made under resolutions of the board of directors of the company, and from re-imbursing J. & W. Seligman & Company for any advances made by them to the company. In 1894 H. B. Hollins & Company formed a syndicate and raised $3,000,000 for the company, in return for which the Seligmans were to remunerate Hollins & Company with 7,500 shares of the stock of the traction company, valued at $130,000.

Trolley Fenders as Mosquito Catchers.

A dyspeptic New Yorker writing about Jersey City, N. J., in the *Sun*, says: "What a stranger might take for fenders on the trolley cars are not fenders at all, but mosquito catchers. When the mosquito is struck, the mosquito catcher, with a sudden twist, tosses its body from the track. More mosquitoes than citizens are killed yearly by the trolleys."

Electricity.

It is as old as life, as mysterious as death and as everlasting as eternity. It is as bright as the stars of heaven; it is as silent as the graves of men. It is as powerful as fate, as subtle as sympathy, as swift as thought. And it is developing as rapidly as Jack's fabulous beanstalk.—*Detroit Free Press.*

The directors of the electric road from Auburn to Port Byron, N. Y., are much pleased with the outlook and feel confident that the road will prove a paying investment. They announce that the road will be ready about July, 1896, and will be known as the Auburn Interurban Electric Road.

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Electric Railways.

SOUTH FRAMINGHAM, MASS.—The Milford, Holliston & Framingham Electric Railway Company has applied for a franchise to the towns through which it will operate its new road to Milford from South Framingham.

CUDAHY, WIS.—The Milwaukee Street Railway Company has broken ground at St. Francis for the street car line to this place.

ALBANY, N. Y.—The Albany, Helderberg & Schoharie Railway has been organized by the election of the following: J. W. Van Valkenburgh, president; Jonas H. Brooks, vice-president; Theodore Little, treasurer; W. E. Erwin, secretary; C. C. Knower, manager. Directors: B. M. Secor, C. W. Van Valkenburgh, L. C. Warner, Jonas H. Brooks, Albany; Ezra Twitchell, Schoharie; Jacob Kelsh, Dr. Sugden, Gallupville; Thomas J. Wood, Theodore Little, Charles A. Dietz, Berne; Dr. C. J. Crounse, Clarksville; and J. M. Erwin, New Salem. Grading will begin in October.

RICHMOND, VA.—The Richmond Traction Company has been organized by John Skelton Williams, of Richmond; J. William Middendorf, of Baltimore, and others; have secured franchise from the City Council to build an electric line on Broad and other streets.

MONTGOMERY, ALA.—The Montgomery Electric and Supply Company will construct the proposed electric road from Tuskegee, Ala., to Cheraw.

KNOXVILLE, TENN.—The Citizens' Railway Company has been incorporated by W. G. McAdoo, F. K. Huger, and others, to build an electric line in the city and county.

OIL CITY, PA.—Oil City Rapid Transit Company has been incorporated by James W. Rowland, Charles W. Mackey, William H. Forbes and Edward E. Hughes, with a capital stock of $70,000.

PHILADELPHIA, PA.—The Schuylkill Traction Company has given a contract to the Philadelphia Construction Company to extend its trolley line six miles through Heckscherville Valley from Minersville.

ALLEGHENY, PA.—Allegheny & Chartier Railway Company has been incorporated by George H. Brown, G. T. Updegraff, T. M. Sieman, with a capital stock of $15,000.

TIFFIN, OHIO.—The Tiffin and Fostoria Electric street railroad line, upon which about $30,000 has already been expended, has been offered by the sheriff for sale, the second time, without receiving a bid.

SEA ISLE CITY, N. J.—A movement is on foot to build a trolley road from Stone Harbor, at the lower end of Seven Mile Beach, to Cape May Court House. The distance is about four and one-half miles, and the cost of the road will be upwards of $100,000.

LOS ANGELES, CAL.—The Los Angeles Consolidated Electric Railway has been sold to Col. A. H. Payson of the Pacific Rolling Mills of San Francisco, representing the bondholders, for $1,500,000.

NEW BRUNSWICK, N. J.—The Pennsylvania Railroad, it is understood, is preparing to apply the trolley system to its branch from this place to Millstone.

CLEVELAND, OHIO.—Articles of incorporation have been granted to the Wooster, Medina & Cleveland Street Railway Company. The incorporators are L. P. Fhliger, J. R. Zimmerman, A. Cunningham, C. V. Hard, Charles F. Barrett, Fred H. Harding, C. W. Kanke, W. J. Mullins, A. S. Metz, Frank H. Hawley, R. M. McDowell, O. N. Leach, C. A. Stebbins and Warden Wheeler. It will be operated entirely by electricity, and will carry passengers, express matter, United States mail, baggage and freight. The capital stock is $10,000.

FORT WAYNE, IND.—Fort Wayne Lake Everett City Street Railway Company, incorporated; capital stock, $300,000.

BURLINGTON, VT.—The Burlington & Hinesburgh Electric Railroad Company held a stockholders' meeting and re-elected directors as follows: Wm. G. Dacy, James H. McCreery, Robert Avery and John E. Taylor, of New York city; C. W. Brownell, James B. Henderson and F. O. Sinclair, of Burlington; and S. A. Brownell, of Essex Junction; and Albert Ray, of Hinesburgh. The directors are considering plans for the building of the road.

ALBANY, N. Y.—Columbia County Electric Railway Company has been incorporated with a capital of $400,000; length 15 miles, termini Hudson, Philmont and Stockport station. Directors: Hiram McGonegal, New York; Walter S. Wales, Syracuse; Alfred J. Rowles, Ed. J. Hodge, Charles S. Rogers, William H. Van Tassell, Henry Hadley Smith, Sheldon B. Cook, William J. Phillips, of Hudson.

NEW HAVEN, CONN.—The Westport Street Railway Company stock books opened to receive subscriptions to the amount of $25,000.

Electric Light and Power.

HASBROUCK HEIGHTS, N. J.—Hasbrouck Heights Light, Heat and Power Company has been incorporated by Edward M. Anson, Julius Vialois, David B. Mitchell, George Broughton, Jr., and John Hanson. Capital stock, $50,000.

VEAZIE, ME.—New machinery is being added to the electric light station in Veazie.

BARDSTOWN, KY.—The General Electric Company has been awarded contract, at $7,194, to erect an electric light plant for Bardstown.

HERRINGTON, KAS.—The Herrington Water, Light and Power Company has been incorporated by W. S. Morgan, W. S. J. Towner and others with a capital stock of $25,000.

DARLINGTON, S. C.—The Darlington Manufacturing Company is putting in a 450-light electric plant.

MILTON, PA.—Milton Electric Light Works are to be enlarged and the wires extended to Watsontown.

BARRE, MASS.—An electric light plant is to be erected at Barre Falls.

SEATTLE, WASH.—Articles of incorporation have been filed for the Consumers' Electric Company. Incorporators, Thomas Boyd, A. M. Brookes and W. J. Grambs. Capital, $50,000 in $100 shares. Object, to furnish electric light and power.

SUMMIT, N. J.—The Mountain Electric Company has been incorporated by Carrol Ph. Bassett, Adolph Wagner and Frederick Green, with a capital of $100,000 and will do business in Union, Morris and Essex counties.

MINNEAPOLIS, MINN.—The American Signal and Power Company has filed articles of incorporation.

SANTA CRUZ, CAL.—The Santa Cruz Electric Light and Power Company reported to have an attachment issued for $7,600.

BUENA VISTA, VA.—Buena Vista Light and Power Company has been incorporated with S. H. Egolf, president; R. B. Embrey, secretary and treasurer. Capital stock between $5,000 and $25,000. This company has leased the city electric light plant.

VAN BUREN, ARK.—H. J. Isbell, of Parson, Kas., and others are taking steps looking to the establishment of an electric light plant.

BALTIMORE, MD.—The city government is contemplating the erection of an electric light plant for lighting Druid Hill Park.

PARNASSUS, PA.—The Parnassus Light Company, of Parnassus, Westmoreland County, incorporated; capital stock, $2,000.

LE ROY, N. Y.—Le Roy Hydraulic Company incorporated by Chas. F. Prentice, Howard Prentice, Calvin N. Kinney and others, to manufacture electricity. Capital stock, $65,000.

DES MOINES, IOWA.—Western Light and Heat Company has been incorporated with George W. Benedict as president; A. E. Johnson, Liberty, Ind., secretary; E. P. Thompson, of Oakland, Cal., is one of the directors. Capital stock, $250,000.

CYNTHIANA, KY.—The Cynthiana Electric Light Company has been organized with a capital of $10,000.

DES MOINES, IOWA.—Articles of incorporation of the Great Western Light and Power Company have been filed. The incorporators are: E. P. Thompson and N. A. Walker. The object is to supply the city with electric light and power. The capital stock is fixed at $250,000. The principal place of business is in this city.

NEW KENSINGTON, PA.—New Kensington Light Company has been incorporated; capital, $2,000.

PEORIA, ILL.—J. Frank Aldrich, of Chicago, backed by a syndicate in which John R. Walsh is a leading member, will construct a new gas and electric light plant in this city at a cost of several hundred thousand dollars.

GREENPORT, N. Y.—The stockholders of the Greenport Electric Light and Power Company have voted to sell the entire plant.

PHILADELPHIA, PA.—A syndicate which includes a number of Philadelphia capitalists has purchased the rights of a power company which was recently formed to develop the Sault Ste. Marie Canal and has organized the Lake Superior Power Company, with a capital of $2,000,000, to make paper pulp.

AURORA, ILL.—The stock of the Aurora Edison Light Company, incorporated in 1886 and granted a franchise in this city, has recently been purchased by Aurora capitalists and the old corporation revived.

ST. LOUIS, MO.—The International Electric Light Company has been incorporated; capital stock, $5,000. Incorporators, J. M. Davey, George S. Delisle, H. B. Russell, H. E. Chandler and H. G. Ferguson.

WASHINGTON, D. C.—The Washington, Alexandria & Mt. Vernon Railway will build an electric power plant.

SOMERSWORTH, N. H.—The contract for equipping and lighting the county buildings by electricity was awarded to the Consolidated Light and Power Company.

BELLEVILLE, OHIO.—Electric lights will soon be established here.

New Telephone and Telegraph Companies.

JAMESTOWN, N. D.—Owing to increased business, the Northern Pacific Railroad Company has determined to establish a new line of telegraph from this city to Fargo.

SIDNEY, N. Y.—A. H. Bartley has been granted a franchise to establish a telephone service.

DEERFIELD, N. H.—This place is soon to have telephone connection.

LAMAR, COLO.—The latest thing in telephone construction at Lamar is a line of telephone 20 miles in length, running from Lamar to Granada, connecting all the lands of the Powers County Land and Irrigation Company with their main offices in Lamar.

LEWISBURG, PA.—The Home Telephone Company has been incorporated by Cyrus Hoffa, W. D. Himelrich and C. H. Hassenpling to operate in Union and Northumberland counties. Capital stock, $10,000.

MCPHERSON, KAS.—The McPherson Telephone Company has been incorporated. The capital stock is $5,000 and the directors are as follows: J. E. Wright, J. R. Wright, J. G. Maxwell, L. M. Waitt and H. G. Smith.

RED HOOK, N. Y.—The Red Hook Telephone Company have their line completed from this place to Barrytown and Annandale. A pay station has been located at each of the above named places.

MAPLE RAPIDS, MICH.—The Maple Rapids Telephone Company is building a line from Perrinton to Ithaca by way of Pompeii.

SPIRIT LAKE, IA.—The Spirit Lake Telephone Company has filed articles to conduct a business of operating and constructing telephone systems at Spirit Lake and surrounding towns. The officers are W. W. Prichard, president; L. H. Farnham, vice-president; H. E. St. Clair, secretary, and F. W. Barron, treasurer.

RALEIGH, N. C.—Inter-State Telephone and Telegraph Company has obtained franchises at the more important cities and towns in North Carolina, and has arranged to connect Raleigh, Goldsborough, Winston, Newberne, Charlotte, Greensborough, Oxford, Henderson and other places. Work begins in a few days.

MONTPELIER, VT.—The Rapid Telephone and Telegraph Company has succeeded the Tunbridge & Strafford Telegraph Company, and is to extend the line at once to other places.

CHESTER, PA.—An application has been made for a charter for the Delaware County Telegraph and Telephone Company with the following names as charter members: Joseph Messick, I. Engle Cochran, Jr., Joseph Deering, John H. Kerlin, H. V. Smith and Ward R. Bliss. The capital stock is placed at $25,000.

Business Troubles.

PHILADELPHIA, PA.—The Cutter Electrical Manufacturing Company reported assigned, having confessed judgment to the amount of $2,943.

PHILADELPHIA, PA.—The L Dynamo Company, Limited, manufacturers of dynamos and motors, assignment reported.

WILMINGTON, DEL.—The store of the Electrical Construction Company has been closed by Sheriff Gillis on a judgment and execution held by James McIntyre, of Philadelphia.

New Manufacturing Companies.

NEW YORK, N. Y.—Dickenson Electric Supply Company, incorporated by Henry B. Ritter, Henry H. Dickenson, 1112 Broadway, and Allen S. Goodacre. Capital stock, $10,000.

A Car Fender Inventor Wants a Backer.

To the Editor of Electrical Review:

Can you give me the address of one or two manufacturers in the electrical field or some one with money to invest that you think might be induced to give a poor inventor "a boost," as it were? What would be the extreme limit of cost, to be commercially successful, of a trolley-car fender that would be nearly perfect in its operation? I can get up a fender that will be strong and perfectly rigid in operation; can be quickly changed from one end of car to the other; all parts projecting in front of bumper can be instantly folded in out of way; will not follow up and down motion of car; will be instantly thrown to the track if it meet an obstruction; can be instantly thrown to the track by motorman and again raised to any desired height from the track in a moment's time by the motorman without stopping of car; can be set so that when thrown will drop directly on the rails or stop at any height above the rails that may be desired. I also have a number of small articles that are patentable and would be commercially successful, but I need the assistance of some one who has the wherewith to pay for the patent. Answer by letter or through your paper, as you may prefer. Respectfully,

L. Templin.

Florence, Colo., August 21.

American Institute of Electrical Engineers.

Secretary Ralph W. Pope has prepared a little pamphlet designed to meet the demand for information regarding the work of the Institute and how to join it. It is called the "Applicant's Manual," and Mr. Pope will be pleased to send copies to all who apply for them. The present membership of the Institute is 950.

SPECIAL ANNOUNCEMENT.

The demand for good men in the many branches of electrical work is again noticeable.

The Electrical Review desires to aid all who are out of employment in this field, and will publish from now until October 1 all announcements of "Positions Wanted" at *one-third* the regular rate.

Our usual charge is $1.50 for each announcement; one-third will make the cost 50 cents.

Answers may be requested in the care of the Electrical Review office and will be promptly forwarded.

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For the Pacific Coast—Reyer & Atwater, San Francisco, Cal.
Texas—W. T. M. Mottram, Dallas.
Detroit, Mich.—Commercial Electric Engineering Co.
London, Eng.—Robert W. Blackwell.
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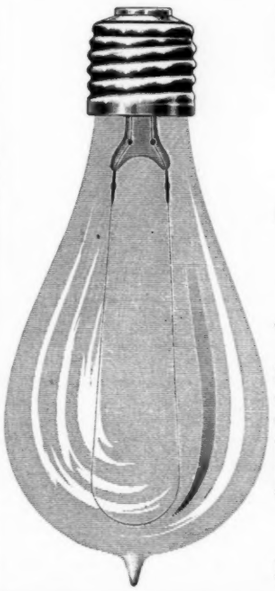

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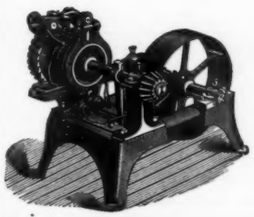

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ELECTRICAL PATENTS

ISSUED AUGUST 27, 1895.

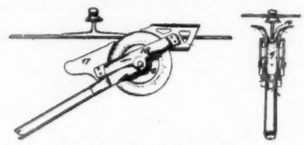
545,042 Hysteresis compensator; B. Abakanowicz, St. Maur, France.

545,069 Electric annunciator; G. J. Galbraith, Boston, Mass.

545,070 Underground electric railway; D. F. Graham, Springfield, Ohio.—The conductors are formed in sections and the contact piece operates a series of switch levers to turn the current into two of the sections at a time.

545,073 Trolley; J. L. Hanson, Omaha, Nebraska.

545,076 Thermostat; G. Hill, New Brunswick, N. J.—A thermostatic strip, a covering box, independently adjustable contacts carried thereby and means for adjusting the box together with circuit connections.



No. 545,393.—TROLLEY GUARD AND GUIDE.

545,091 Electric gas lighting apparatus; J. W. Palmer, Chicago, Ill.—A gas burner pillar, provided with a fixed insulating electrode, an oscillating gas cock, and a plate thereto affixed, and a three-arm vibrating piece, one arm loosely pivoted to said plate, one arm carrying the wiping electrode, and the third arm connected with an actuating rod or wire.

545,111 Means for synchronizing electric motors; E. Thomson and E. W. Rice, Swampscott, Mass.—A continuous current main, a vehicle making contact therewith, a plurality of armatures mounted on said vehicle adapted for continuous current, connections taken from these armatures to rings, at points giving three-phase currents, mains connecting the rings between the several armatures and thereby synchronizing their rotation.

545,127 Elevator indicator; L. Malm, Cleveland, Ohio.—A segmental plate having incandescent lamps arranged there around and showing the different numbers of floors and a centrally pivoted index pointer and electrical connections whereby as the finger moves to each lamp the circuit moves in unison lighting the lamp and displaying the floor number.

No. 545,127.—ELEVATOR INDICATOR.

545,149 Electro-magnetic tool; C. F. Carpenter, Louisville, Ky.—A helix, an iron exterior casing, an iron yoke piece, a fixed electro-magnet and an electro-magnet held in balance, or equipoised between two elastic forces.

545,151 Insulated support for trolley lines; F. X. Cicott, New York, N. Y.

545,158 Electric railway; J. C. Henry, Westfield, N. J.—Main leads and a neutral conductor, two self-regulating dynamos of predetermined but unlike electro-motive force.

545,187 Trolley line clamp; W. J. Belcher, Hartford, Conn.—Consists of an upper and lower clamping member, the lower one having a shank adapted to pass up through a sleeve on the upper member and to clamp between them the line, the two members being held firmly together by means of a nut.

545,191 Telephone holder and cut-out; A. F. Boardman, Somerville, Mass.—A receiver, a clamp therefor comprising a trough and a spring adapted to grasp and hold said receiver, telephone and call circuits, a spindle operated by inserting said receiver into and withdrawing it from the clamp to open or close said circuits.

545,204 Conduit electric railway; C. F. Johnson, San Jose, Cal.—A conduit, an angle iron secured therein forming a continuous shelf, insulating material supported thereby, and a wire having its lower portion embedded in said insulating material and its upper portion exposed.

545,208 Underground electric railway; E. E. Moore, Chicago, Ill.

545,230 Automatic switch for electric or cable railways; G. P. Janvrin, Brooklyn, N. Y.

545,253 Combined telephone receiver support and switch; G. F. Shaver, Yonkers, N. Y.—A T-shaped circuit changing switch, curved up at its outer end, circuit terminals, a pivot, a spring and post with a ring.

545,282 Means for indicating coincidence of phase of two alternating or polyphase current machines; J. F. Gorges, Berlin, Germany.—Two alternating or multiphase machines, each provided with a similarly located auxiliary coil, an indicator for indicating when the separate currents generated by said auxiliary coils correspond in potential.

545,296 Electric conduit; C. J. Kintner, New York, N. Y.

545,306 Street car sign; J. M. Peter, Cincinnati, O.—An incandescent lamp situated within a transparency and having the electric conductor passing through its support.

545,327 Electric target; M. T. Weston, Kenton, O.—The target is provided with a movable bull's eye which is provided with electrical contacts and connections.

545,328 Process of and apparatus for refining metals electrolytically; W. H. Wiggin, Worcester, Mass.

545,347 Commutator or collector brush; C. L. Coffin, Detroit, Mich.—A commutator or collector brush, consisting of a perforated metal strip having a continuous edge.

545,357 Electric signaling device; W. Gillette, New York, N. Y.

545,358 Trolley controller for electric railways; L. W. Gray, New Orleans, La.

545,359 Electric arc lamp; H. T. Harrison, London, Eng.

545,390 Secondary battery; I. A. Timmis, London, Eng.—Consists of a thin sheet of metal corrugated in parallel uninterrupted continuous lines and folded or plated in continuous lines intersecting the corrugations.

545,393 Guard and guide for trolleys; J. R. Trisler, Westwood, O.

545,402 Telephone and return call system; T. R. Brimner, Baltimore, Md.

545,404 Electrically operated mine car; H. B. Dierdorff, Columbus, O.—A mine car having a body or frame supported upon track wheels and constructed of metal throughout in several parts, separable on central vertical planes of division and adapted to be bolted together.

545,405 System of electrical distribution; T. A. Edison, Llewellyn Park, N. J.

545,416 Telephone; G. F. Shaver, Yonkers, N. Y.

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REFERENCES: D. N. Morgan, U. S. Treasurer; John Goode, ex Solicitor Gen'l U. S.; Capt. L. G. Parker, U. S. Army; A. B. Duvall, Dist. Attorney for District of Columbia.
EDW. S. DUVALL, JR., Solicitor of Patents, Loan and Trust Bldg., WASHINGTON, D. C.

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